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ABSTRACT

This curriculum guide on home management, covering one of the five content areas of the Energy and Family Curriculum Guide, has been designed to provide learning experiences and identify resources that can be used to develop units of study related to energy usage and conservation. The guide is intended for use in comprehensive courses of home economics as well as specialized courses of the home economics subject matter content areas, especially in the state of Texas. The guide contains six units: percentage of home energy use, energy usage of appliances, energy conservation in home activities, and managing transportation, leisure time, and existing resources in the interests of conservation. For each major concept, the guide provides a competency statement, terminal performance objectives, as well as concepts and generalizations linked to specific learning experiences and resources. The guide contains three appendixes. Appendix A contains a bibliography of books, pamphlets, multimedia materials, and other teaching aids. Appendix B contains prepared information sheets, games, bulletin board ideas, check sheets, evaluation forms, and transparency masters. Appendix C is a collection of background information that may be helpful to the teacher in using the learning experiences. A glossary completes the curriculum guide. (KC)

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TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

FOREWORD

The level of energy literacy must be raised in our nation. The citizens of the future need to be more knowledgeable about energy and begin now to make wise decisions for the future use of energy. Home Economics Education programs are designed to teach decision making, value clarification, and identification of resources being used by individuals and families in the homes of our nation.

There are things we can do to help citizens of the future to be more knowledgeable about energy and begin to make wise decisions about use of energy. The Energy and the Family Curriculum Guide has been designed to provide learning experiences and identify resources that can be used to develop units of study related to energy usage and conservation. The guide has been prepared for use in comprehensive courses of Home Economics I and Home Economics, II, as well as specialized courses of the Home Economics subject matter content areas. Materials included in the guide are organized into five content areas of Home Economics:

1. Consumer Education
2. Foods and Nutrition
3. Home Management
4. Housing and Home Furnishings
5. Textiles and Clothing

Competency statements and terminal performance objectives were developed for the broad conceptual areas of study. Generalization statements related to key concepts were written opposite appropriate learning experiences. The domains and levels of learning were considered in developing learning experiences. Suggested resources were referred to and can be found in appendices at the end of each content area section. Appendix A contains a bibliography of books, pamphlets, multimedia materials and other teaching materials. Appendix B has prepared information sheets, games, bulletin board ideas, check sheets, evaluation forms and transparency masters. Appendix C is a collection of background information that may be helpful to the teacher in using the learning experiences.

Dr. Jane S. Davidson, Ph.D.
Associate Professor
Lamar University

Ms. Carol Morris
Coordinator-Consumer Information
Gulf States Utilities

ENERGY AND THE FAMILY CURRICULUM

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ACKNOWLEDGEMENTS

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(Home Economics I)

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Ms. Marvelle Donaldson
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HOME MANAGEMENT

MAJOR CONCEPT: Percentage of Home Energy Use

SUGGESTED FOR: Home Management

COMPETENCY STATEMENT: Show awareness of home energy use

TERMINAL PERFORMANCE OBJECTIVES: The student will be able to:

Define energy uses in the home.

Identify percentages of energy used in the home.

Identify factors influencing energy choices in the home.

CONCEPTS AND GENERALIZATIONS	LEARNING EXPERIENCES AND RESOURCES
Uses of Energy	
Almost 20 percent of all the energy consumed in the United States is used in the home.	*Constuct bulletin board or transparency illustrating where energy comes from and where it goes. (What's New in Home Economics-January 1974.) See Appendix B, page 25.
The family's standard of living affects the energy usage of the home.	Complete class activity-"Energy Choices." See Appendix B, pages 20-22. Discuss.
	*Complete "Scavenger Hunt" using Student Activity Sheet to take home and complete. See Appendix B, pages 23-24. Brainstorm factors influencing the use of energy. Include such factors as personal goals, family goals, socio-economic status, cultural background, and stages in the family life cycle.
	Complete Worksheet-"How Do You Use Your Home Energy?" See Appendix B, page 26.
	As a daily activity for individual and group discussion, list energy consumed using the "Daily Energy Log." See Appendix B, page 27.
A home built to energy efficient construction standards uses less energy for heating and cooling.	*Construct pie graphs to illustrate the comparisons of energy used by a home of standard construction to a home of energy efficient construction. See Appendix B, page 28.

MAJOR CONCEPT: Home Management: Energy Usage of Appliances

SUGGESTED FOR: Home Management

COMPETENCY STATEMENT: Determine energy use and operating costs of home appliances.

TERMINAL PERFORMANCE OBJECTIVES: The student will be able to:

Define wattage of appliances.

Locate the wattage nameplate on an appliance.

Explain kilowatt.

Compute the operating cost of appliances.

CONCEPTS AND GENERALIZATIONS	LEARNING EXPERIENCES AND RESOURCES
Energy Use of Appliances	
The electricity needed to operate an electric appliance and light source is measured in watts.	Discuss general information on power usage of appliances and related terms. See "Understanding Electrical Terms and Appliance Wattage" - Appendix B, pages 29-30 and "Wattages of Common Appliances," p. 34.
	*Organize class for small group activity "So You're Moving to a New Earth!" See Appendix B, pages 31-35.
	"Display bulletin boards--"Which One Are You?" See Appendix B, page 36 or "Better Living with Less Energy" - Available in Energy and the Family loan kit, from Marketing and Consumer Services Department, GSU.
You can usually find the number of watts on the appliance by looking at the nameplate.	Display poster or transparency to illustrate nameplate on an appliance. Appendix B, page 37.
	Work in small groups to determine the wattage on several appliances by locating and reading the nameplate.
A kilowatt hour is a unit of measurement for electric energy used to determine the operating cost of an appliance.	*Calculate cost of operating appliances. See Appendix B, pages, 30, 38, and 39.
	Extra Activity for advanced students: Involve students with additional problems. See Appendix B, Set 2 and 3, pages 40-44.

MAJOR CONCEPT: Energy Conservation in Home Activities

SUGGESTED FOR: Home Management

COMPETENCY STATEMENT: Accept responsibility for energy conservation in home activities.

TERMINAL PERFORMANCE OBJECTIVES: The student will be able to:

Define energy conservation.

List appliance features that conserve energy for home activities.

Relate the energy efficiency of major home appliances to their use and care.

CONCEPTS AND GENERALIZATIONS	LEARNING EXPERIENCES AND RESOURCES
Energy Conservation	
Energy conservation is keeping the amount of energy consumed to a minimum by utilizing methods that will allow maximum use of available energy without needless waste.	*Distribute large Capital E's and C's to students and have each student complete 10 sentences, "Energy Conservation Is ----------." on their letter. Discuss. Display on bulletin board. See Appendix B, pages 45-46.
An awareness of energy consumption can serve as a guide for adapting energy efficient practices.	Complete student survey - "Energy Consciousness" using Activity Spirit Master from "The Energy Crisis Comes Home" Multimedia. See Appendix A.
	*Complete "Whiz Kids - Energy Quiz" from Coed. May 1977. See Appendix B, page 47.
	Complete "Find-a-Word Puzzle." See Appendix B, page 48.
Careful selection of features in appliances can assist in energy conservation.	*Brainstorm selection features for each major appliance that will help the appliance to conserve energy. Use a flip chart for reference later. See Appendix B, page 49.
Energy Conservation Practices General	
Every conservation practice you perform saves energy.	*Use "Better Living With Less Energy" set of transparencies from Energy and The Family Loan Kit to explain energy efficient use of appliances and equipment. See Appendix A.
	View transparency, "Average Annual Energy Use by Appliance." See Appendix B, page 50.

Show sound filmstrip "The Energy Crisis Comes Home" Multi-media Unit. See Appendix A.

*Have utility representative present program on energy-efficient use of appliances and equipment.

Construct bulletin board for tips on efficient use -- Dr. Kilo Watt -- See Appendix B, page 51.

Heating and cooling consumes about 55 percent of the energy used in the home.

*Brainstorm the types of heating and cooling systems available for home use. See Appendix B, Home Furnishings, page __.

Collect pictures of types of heating and cooling equipment and duct work from catalogs or magazines.

*Brainstorm the practices that influence energy consumption of the space heating and cooling systems. Hand out "Family Energy Saving Tips for the Home" after brainstorming. Discuss space heating and cooling tips not mentioned. See Appendix B, pages 52-53.

Divide class into groups and devise a checklist to evaluate energy used for heating and cooling homes. (Could use collection of pamphlets for this.)

Use poster as a discussion tool for student checklist. "Energy Crisis Comes Home." See Appendix A.

Water heating consumes approximately 12-20 percent of the energy used in homes.

*Brainstorm on hot water usage. Hand out "Water Heaters" information sheets after brainstorming. Discuss tips not mentioned in brainstorming session. See Appendix B, page 54.

Construct bulletin board on water heating. See Appendix B, page 63.

There are several factors that determine the energy consumption of a water heater.

1. size
2. location
3. temperature setting
4. amount of insulation
5. hot water consumption

*Students will conduct "Hot Water Audit" on their own home and bring results to class and share conservation measures with their families. See Appendix B, pages 64-65.

There are also many ways to conserve energy used to heat water.

Most people require less water for showering than bathing.

*Students will do the activity "Shower vs. Bath" to determine which uses less water. See Appendix B, page 66.

Food management consumes at least 15 percent of the energy used in our homes.

*Brainstorm on energy efficient use of appliances and equipment in the kitchen. Discuss tips not mentioned in brainstorming from "Family Energy Saving Tips for the Home." See Appendix B, pages 54-58.

Play "Waste and Save Game". See Appendix B, page 67.

Laundering consumes about 4 percent of the energy used in the home, in addition to the hot water used.

Show slide presentation "Laundry Problems of the 80's" from The Maytag Corporation of "How Maytag is Helping Consumers with Energy Conservation." See Appendix A.

*Brainstorm on energy efficient tips for using the washer and dryer. Hand out tip sheet on using the washer and dryer after brainstorming. Discuss tips not mentioned in brainstorming. See "Family Energy Saving Tips for the Home," Appendix B, pages 58-59.

*Discuss how energy is wasted by not following directions when using cleaning products and laundry equipment. Discuss why solar drying is not practical for all types of laundry articles.

Assign acitivity using Activity Sheet - "Energy Saving Tips for the Laundry" ditto master from Nasco. See Appendix A.

MAJOR CONCEPT: Energy Conservation in Home Activities: Menu Planning

SUGGESTED FOR: Home Management

COMPETENCY STATEMENT: Demonstrate energy saving practices in menu planning through the use of small appliances.

TERMINAL PERFORMANCE OBJECTIVES: The student will be able to:

List small appliances that reduce energy consumption.

Give examples of menus that can be prepared using small appliances.

CONCEPTS AND GENERALIZATIONS	LEARNING EXPERIENCES AND RESOURCES
Menu Planning	
Small appliances can do the same job without using as much energy.	Brainstorm types of small appliances available for preparing a meal. *Brainstorm on energy efficient use of small appliances in food preparation as transparencies are shown. Discuss tips not mentioned in brainstorming. See section on small appliances "Family Energy Saving Tips for the Home," Appendix B, page 56. Discuss energy consumption of conventional small appliances versus conventional ovens. Debate pros and cons of using small appliances versus the range. Use resource person to demonstrate dishes prepared with small appliances.
Changing food preparation planning can reduce the amount of energy used in food preparation activities.	*Divide class into small groups. Each group will plan a menu using the most energy efficient method of preparation. Home Experience - Plan and prepare a menu using small appliances and energy efficient practices learned in class. Report to the class the results of the meal. (If applicable a classroom lab activity could be planned.)

MAJOR CONCEPT: Energy Conservation in Home Activities

SUGGESTED FOR: Home Management

COMPETENCY STATEMENT: Determine ways to use energy efficiently in household cleaning.

TERMINAL PERFORMANCE OBJECTIVES: The student will be able to:

List household clean-up jobs using electric appliances.

Discuss energy cleaning tips.

Relate energy tips to household job performance.

Plan household job calendar using electric appliances.

CONCEPTS AND GENERALIZATIONS	LEARNING EXPERIENCES AND RESOURCES
Household cleaning	
In today's society, for continued maintenance of a home, many household cleaning jobs must be performed using the least amount of time and energy.	*Brainstorm to develop a list of household jobs performed by electrical appliances in the home. *Discuss energy-saving cleaning tips using handout. See "Family Energy Saving Tips for the Home," Appendix B, page 60. Assign students a household chore. Plan steps in performance of task, taking into consideration energy consumption, human energy and time span. Have students write an energy tip in the form of a "Heloise Hint." Devise a monthly calendar of household tasks and assign jobs to family members using electric machines wisely and conservatively.

MAJOR CONCEPT: Energy Conservation in Home Activities

SUGGESTED FOR: Home Management

COMPETENCY STATEMENT: Analyze energy saving methods for using personal care appliances.

TERMINAL PERFORMANCE OBJECTIVES: The student will be able to:

Identify energy-consuming items for personal use.

Give examples of energy tips for personal grooming.

Relate energy consuming items to personal use.

CONCEPTS AND GENERALIZATIONS	LEARNING EXPERIENCES AND RESOURCES
Personal Uses	
The American market of personal use appliances has greatly increased in recent years.	Using a list, "Personal Use Appliances," have students circle those that they use during the day. See Appendix B, page 68.
Energy can be conserved through wise use of energy-consuming grooming and personal use appliances.	Divide class into groups, and using the above list, have each group devise an energy tip for each appliance. Then share with the group. See examples in "Family Energy Saving Tips for the Home." See Appendix B, page 61.
	Distribute class activity sheet - "Energy Use and Abuse Chart." See Appendix B, page 69.
	(See Clothing and Textiles Unit for related experiences.)

MAJOR CONCEPT: Home Management - Managing Transportation

SUGGESTED FOR: Home Management

COMPETENCY STATEMENT: Accept responsibility for energy conservation through transportation choices.

TERMINAL PERFORMANCE OBJECTIVES: The student will be able to:

Identify the wide variety of transportation choices.

Relate energy practices to the use of the family car.

Schedule a shopping trip.

CONCEPTS AND GENERALIZATIONS	LEARNING EXPERIENCES AND RESOURCES
Transportation	
Transportation is the act of moving from one place to another.	Use pictures to illustrate different modes of transportation.
	Brainstorm on board or chart different modes of transportation. Living Today pages 210-213. Appendix A.
	*Complete worksheet. "There are Other Ways to Get From Here to There." Appendix B, page 70.
	Refer to bulletin board for discussion. "How Do You Get From Here To There?" Appendix B, page 71.
One of the most common modes of transportation is the family car.	View filmstrip - "Energy Management" Part II, Appendix A.
	Discuss handout "Family Energy-Saving Tips for Transportation." See Consumer Education, Appendix B, pages 94-96.
	Role play how family activities would be changed if there was only one car. (Consider options if gasoline were rationed.)
A major energy waster is a poorly planned shopping trip.	View filmstrip - "Declaring Your Interdependence," J. C. Penney, "Systems," Appendix A.
	*Complete worksheet "Mrs. Smith's Shopping Trip," Appendix B, page 72. Discuss the shopping trip worksheet and have students give reasons for their choices.

MAJOR CONCEPT: Home Management: Managing Leisure Time

SUGGESTED FOR: Home Management

COMPETENCY STATEMENT: Be aware that consumers should be concerned about energy usage for leisure time activities.

TERMINAL PERFORMANCE OBJECTIVES: The student will be able to:

Complete and discuss attitude survey.

Identify kinds of recreational activities.

Compute energy required for leisure time.

Develop a plan for energy-wise T.V. viewing.

CONCEPTS AND GENERALIZATIONS	LEARNING EXPERIENCES AND RESOURCES
Leisure Time	
Modern Americans have more time for recreation than did their ancestors.	Complete and discuss Attitude Inventory No. 11 in Consumer Education, page 381. See Appendix A. *Write a paragraph about a recreational activity for your family or friends which would use a limited amount of energy. Example: Bicycle to the park for a cook-out.
American recreation activities involving the use of expensive fuel, are changing. In their place, leisure and entertainment services geared to the consumer interested in self-fulfillment and self-realization are emerging.	Chart family's leisure time activities. Compute the energy required for one hour participation. See Appendix B, Calculating Monthly Energy Costs of Appliances, pages 42-44 or use "Watt's Going On" pamphlet from GSU. Role play how decisions are made for family viewing using situations such as this: "Because of the energy crisis, your family has decided to use one television set for two hours each day, instead of 2 television sets for unlimited hours." *Analyze energy use in leisure time activities. See "Leisure-Time Activities", Appendix B, page 76. Brainstorm on energy saving tips for leisure time activities. See "Family Energy Saving Tips" after brainstorming. Discuss tips not mentioned.

MAJOR CONCEPT: Home Management: Managing Existing Resources

SUGGESTED FOR: Home Management

COMPETENCY STATEMENT: Recognize that new habits and human reactions can affect energy usage.

TERMINAL PERFORMANCE OBJECTIVES: The student will be able to:

Identify habits and how they are formed.

Compute information received from a home audit.

CONCEPTS AND GENERALIZATIONS	LEARNING EXPERIENCES AND RESOURCES
Changing Habits	
A habit is formed by repeating an action over and over until it is automatic.	Make a list of energy-related actions usually performed by habit. Discuss ways to improve or change these habits. Show and discuss film-"Energy Management," Part I (A Guide to Saving Energy and Money at Home), Appendix A. *Have students complete an energy audit. See Appendix B, pages 77-78. Compute score and list those items which represent habits needing to be changed. Study pamphlet: "Equip for the 80's - Adjusting Our Lives to Stretch Energy." See Appendix A.
Decision-Making	
Effective money management and decision-making skills can assist in the final cost/benefit analysis of energy conservation methods.	*Discuss energy audit with family and make plans for changing energy usage habits. Compare cost of items needed to make their home more energy efficient and help the family make decisions according to price and energy saving features. Resources: a. Energy Savers Low Cost-No Cost - D.O.E. pamphlet. See Appendix A. b. Energy Saving Projects You Can Build - Better Homes and Garden, See Appendix A. c. Creative Living, Foster, page 25-29. See Appendix A. d. "An Acceptance of Limits on Resources,"

pages 18-21, J. C. Penney Forum-Fall '81. See Appendix A.

Report to class the results of the conservation method used from the above home experience activity.

To be effective, every family member must be involved in energy conservation.

Write a letter from their unborn great-grandchild, dated 2050, describing life as it it is because their forefathers wasted energy and as it could be if they had been conservative. Reading each other's letters and comparing ideas can lead to interesting discussion.

Answer questions for Post-test "Energy Choices," Appendix B, pages 20-22.

Involve students in playing Household Management Game, "The Energy Race." See Appendix A.

Complete worksheet "What's Wrong Here?" Activity 1, Unit 4. U.S. Department of Energy. See Appendix B, page 73.

Energy conservaton should be practiced in the community and schools as well as the home.

Plan an "Energy Conservation Week" as an in-class F.H.A. activity, involving the whole student body and faculty. For suggested activities, see Appendix B, page 79.

Conclude the study of energy by planning and participating in an "Energy Conservation Week."

APPENDIX A

HOME MANAGEMENT

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Home Management

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APPENDIX B

TEACHING MATERIALS

HOME MANAGEMENT

"ENERGY CHOICES"

Read each statement, then circle your one choice for each.

1. You just came home from playing football at school and you want to clean up. Would you:

   1. take a shower, or
   2. take a tub bath?

   Reason for choice:_____

   _____

2. It is evening, and you are in your room. Your mother asks you to come to the kitchen for a few minutes to help her. Would you:

   1. leave the lights on in your room, since you'll be back in a few minutes, or
   2. turn off the lights in your room?

   Reason for choice:_____

   _____

3. You just come home from school and want a snack. Would you:

   1. open the refrigerator and poke around in it to see what's there, or
   2. decide what you want to eat, then quickly remove it from the refrigerator?

   Reason for choice:_____

   _____

4. You are cooking a casserole dinner for your family. Would you:

   1. preheat the oven, or
   2. start baking the casserole in a cool oven?

   Reason for choice:_____

   _____

5. Your family is away from home and you are responsible for the laundry. There are only a few soiled clothes to be washed. Would you:

   1. wash the few soiled items, or
   2. wait until a full load of soiled clothes needs to be washed, then wash the clothes?

   Reason for choice:_____

   _____

6. Your family is remodeling the bathroom, and can't decide on a light fixture. Would you:

   1. recommend fluorescent lighting, or
   2. incandescent lighting?

   Reason for choice: _____

   _____

7. You just came in from softball practice and in order to cool off quickly, would you:

   1. turn the thermostat on the air conditioner down, or
   2. use a portable fan and leave the thermostat setting as it is?

   Reason for choice: _____

   _____

8. Your want your bread toasted. Would you:

   1. use a small toaster, or
   2. use the broiler element in the conventional oven?

   Reason for choice: _____

   _____

9. You are responsible for washing dishes used during the day. Would you:

   1. wash dishes by hand, or
   2. use the dishwasher?

   Reason of choice: _____

   _____

10. You need to wash a load of normally soiled clothes. Would you:

    1. Use warm water for washing and cold water for rinsing, or
    2. hot water for both washing and rinsing?

    Reason for choice: _____

    _____

"ENERGY CHOICES"

Answer Sheet

1. This choice depends on the length of time you are in the shower. About ten gallons of water per minute goes down the drain when showering. In general, take a short shower or take a bath in a partially-filled tub. (When using shower flow controls, only 3-5 gallons per minute are used.)

2. Turn off incandescent lights when leaving your room. It is always more energy efficient to turn lights off.

3. Decide what you want to eat, then quickly remove it from the refrigerator. Energy is wasted when the refrigerator door is open too long.

4. Start baking a casserole in a cool oven. Only preheat the oven for items that rise during baking, such as cakes and cookies.

5. Wash only full loads of clothes. Water and energy are wasted doing small loads of clothes.

6. Fluorescent tubes produce up to four times as much light as incandescents using the same amount of electricity, yet they last up to seven times longer.

7. Use a portable fan and leave the air conditioner's thermostat setting as it is. Portable fans are energy efficeint, use them to circulate conditioned air.

8. Use a small toaster. Using a portable appliance is one of the fastest and most economical ways to prepare many foods.

9. Use the dishwasher because washing dishes by hand after each meal uses more hot water than a dishwasher. Nine to fourteen gallons of hot water is used for one meal's hand washing, while eleven to sixteen gallons are used for a dishwasher load containing a full day's dishes.

10. Use warm water for washing and cool water for rinsing. The best balance between energy conservation and cleaning is to wash in water above 80°F (27°C) for normal soil conditions. The closest setting on the washer is warm, which is approximately 95°F (35°C). Occasionally wash in hot water, consistent with garment labeling, if soil accumulates after several launderings. Wash in hot water for heavily soiled clothes.

HOME SCAVENGER HUNT

It may surprise you to discover that you have so many appliances and houseware items which require electricity. Place a check beside each of the following which you have in your home. Please add those which are not listed.

Major Electrical Appliances

____Clothes dryer
____Clothes washer
____Dishwasher
____Food Freezer
____Food waste disposal
____Ice Cube Maker
____Range (Stove)
____Refrigerator
____Trash Compactor
____Water Heater
____
____
____

Electric Housekeeping Appliances

____Floor polisher
____Floor scrubber
____Iron
____Rug shampooer
____Vacuum cleaner
____Water softener
____
____
____

Electric appliances for Hobbies, Amusement, Recreation, Do-It-Yourself

____Adding machine
____Aquarium filter and heater
____Barbeque
____Battery charger
____Calculator
____Charcoal lighter
____Dog clippers
____Eraser
____Fireplace log
____Movie projector
____Organ
____Pencil sharpener
____Piano
____Phonograph
____Photo enlarger
____Power tools
____Radio
____Sewing machine
____Scissors
____Slide projector
____Soldering iron
____Stereo/tape player
____Swimming pool filter
____Tape recorder
____Television
____Toys
____Typewriter

Electric Houseware

____Baby food warmer
____Bean pot or slow cooker
____Blender
____Bottle warmer
____Broiler-Toaster oven
____Can opener
____Carving knife
____Chafing dish
____Coffee maker
____Corn popper
____Deep fat fryer
____Dutch oven
____Fondue pot
____Food mixer or grinder
____Griddle
____Hot plate
____Ice cream freezer
____Ice crusher
____Juice extractor
____Knife
____Microwave oven
____Rotisserie oven
____Sharpener
____Skillet
____Sterilizer
____Toaster
____Waffle iron
____Warming tray
____Yogurt maker

SOURCE: ENCORE, Department of Industrial Education, Texas A & M University.

Electric Appliances Providing Personal Comfort, Convenience, Hygiene and Appearance

____Air conditioner (central)
____Air conditioner (window)
____Air purifier
____Blanket
____Clock
____Clothes brush
____Curling iron
____Curlers
____Dehumidifier
____Electrostatic air cleaner
____Evaporative cooler
____Exerciser
____Fans, attic
____Fans, circulating
____Fans, kitchen exhaust
____Foot and back massager
____Garage door opener
____Hair clippers
____Heat lamp
____Hot comb
____Hot lather dispenser
____Heating and blower
____Humidifier
____Lighted mirror
____Manicure set
____Range hoodlight and fan
____Shaver
____Reducing Machine
____Shoe polisher
____Sun lamp
____Toothbrush
____Vaporizer
____Water pic
____Whirlpool bath

Light bulbs

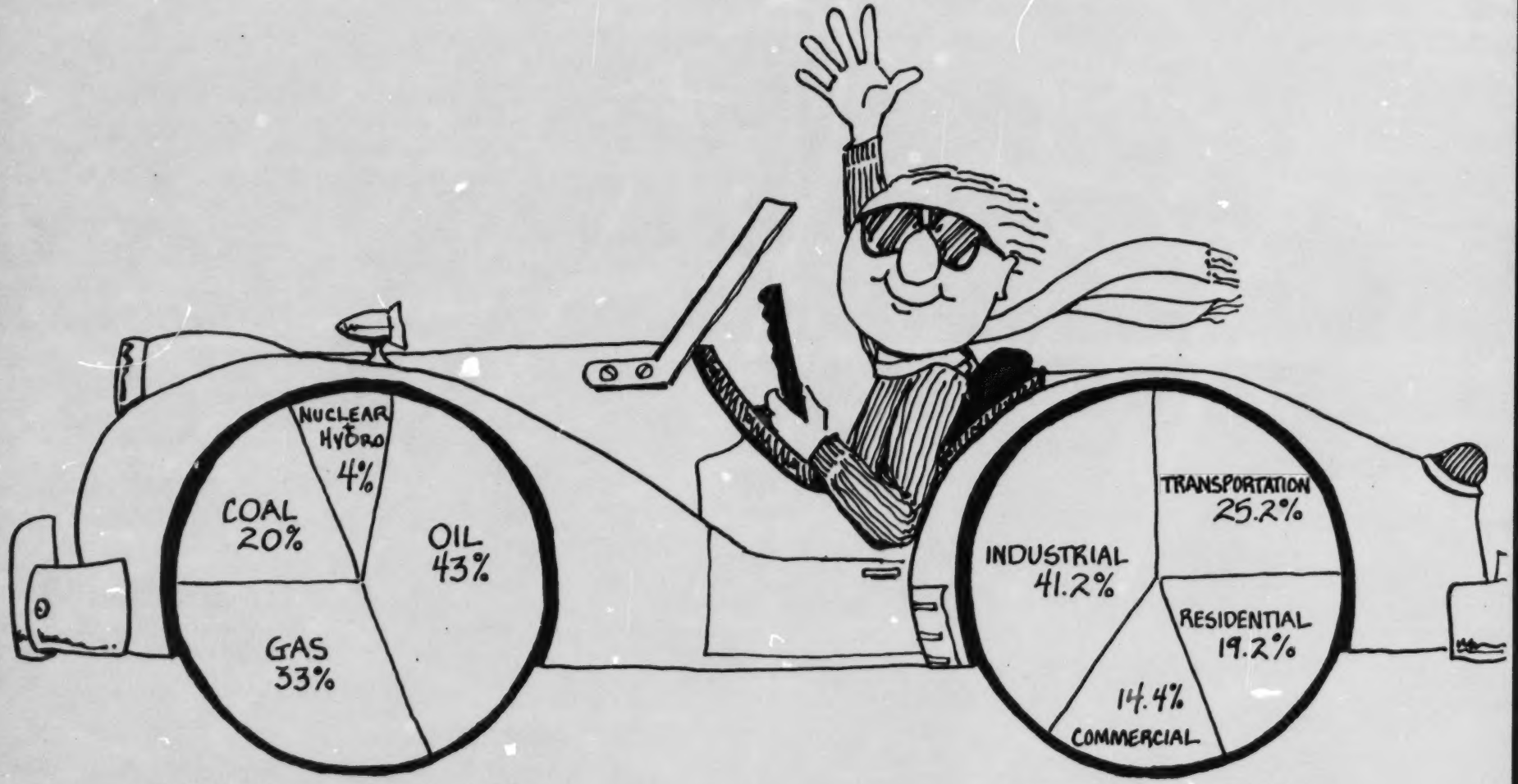
____60 Watts
____75 Watts
____100 Watts
____150 Watts
____ ___ Watts
____ ___ Watts

Don't forget the light in the refrigerator!

Go back and very carefully put a circle around the 5 things which you feel use the most electricity. Take a class tally, see who was closest by comparing it to "Watt's Going On" chart on appliance wattages.

SOURCE: ENCORE, Department of Industrial Education, Texas A & M University.

ENERGY



WHERE IT COMES FROM

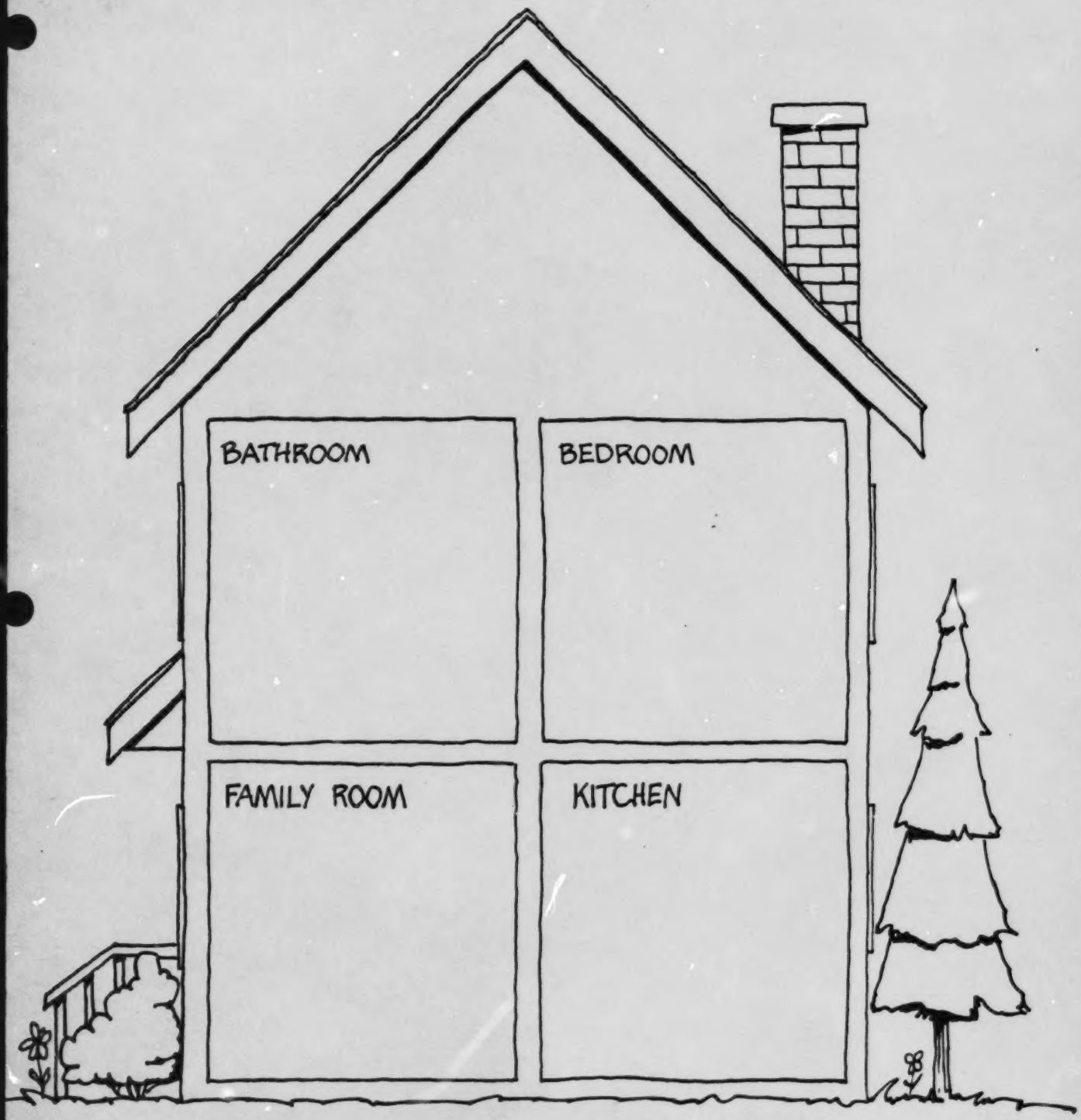
WHERE IT GOES

25

33

34

HOW DO YOU USE YOUR HOME ENERGY?



LIST ALL OF THE ELECTRICAL APPLIANCES YOU MAKE USE OF. DECIDE WHETHER EACH OF THESE IS A NECESSITY OR LUXURY. PLACE AN "N" BESIDE THE NECESSITIES AND AN "L" BESIDE THE LUXURIES.

Daily Energy Log

Day 1 - List direct energy used. Example: Turn on a light.

Day 2 - List indirect energy used. Example: Ice cubes, hot water.

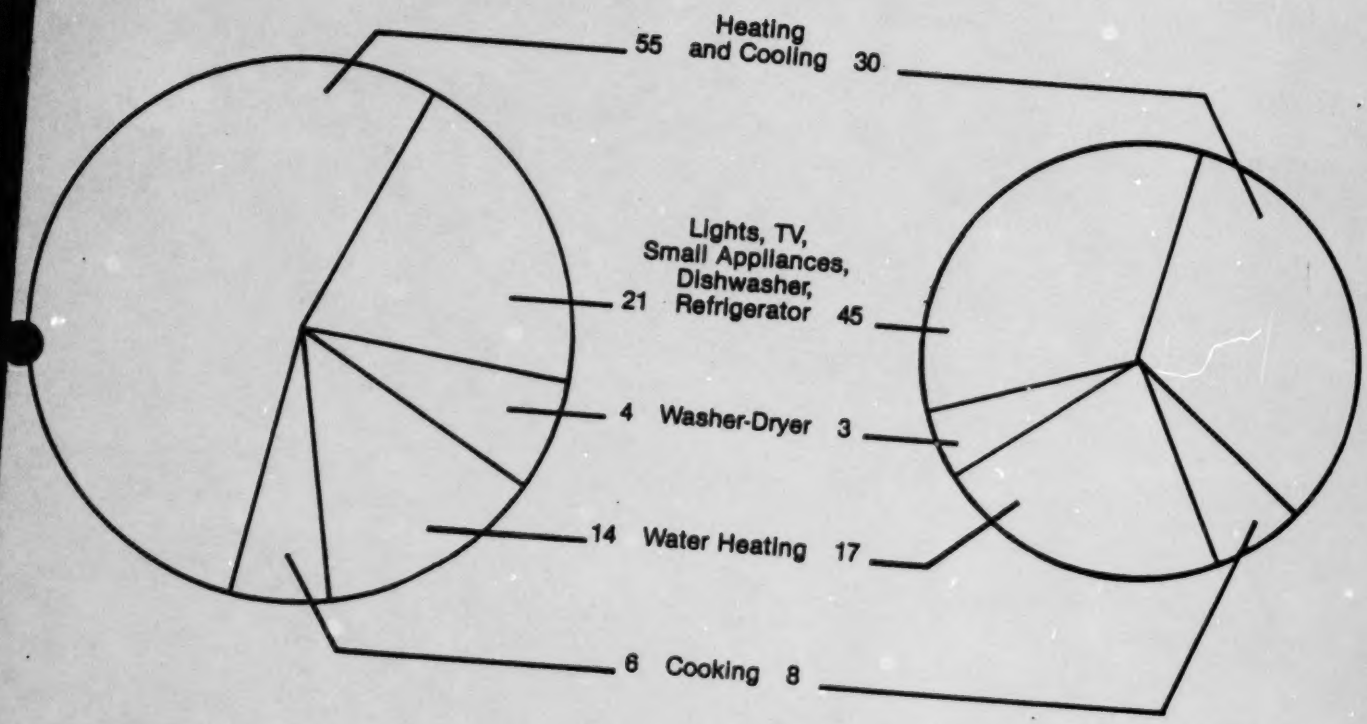
Day 3 - List public energy used. Example: Use lights, etc., in a public building.

Day 4 - List products used that are made form petro-chemicals. Example: synthetic fabrics, plastic wrap.

Day 5 - List products used which require energy to manufacture. Example: shoes, furniture, toys.

Average Energy Use by Category
TP&L & University of Texas

Energy Use by Appliance
Gulf States Energy Research Home
N.E.W. Certified



UNDERSTANDING ELECTRICAL TERMS AND APPLIANCES WATTAGE

The electrical terms you should know are WATTS, KILOWATTS, AND KILOWATTHOURS. The abbreviations are:

WATT	W
KILOWATT	KW
KILOWATTHOUR	KWH

DEFINITIONS:

WATT (W): The amount of electricity needed to operate an electric appliance, light source, and all electric equipment. (Just as gasoline is measured in gallons, electricity is measured in watts.)

The amount of electricity (watts) needed can usually be found by looking at the nameplate on the appliance.

Model No. 000000	
Volts	Watts
120	1500

Sometimes the appliance manufacturer rather than showing the number of watts, chooses to use the number of volts and amps (ampere). If you see these terms on the appliance nameplate you are checking, figure the wattage as follows:

Watts = Volts x amps

Example: 120 volts x 15 amps = 1800 watts

KILOWATT (KW): Kilowatt - Kilo means one thousand so Kilowatt means 1000 watts.

1000 watts (W) = 1 Kilowatt (KW)

Example: 2000 watts (W) = 2 Kilowatts (KW)
1500 watts (W) = 1.5 Kilowatts (KW)

Thus to calculate Kilowatts (KW) you divide the number of watts by 1000. Watts/1000 = kilowatts (KW).

KILOWATTHOUR (KWH): As an electric appliance is being used in the home, the amount of electric energy it uses is recorded on a meter in Kilowatthours. A Kilowatthour is the equivalent of 1,000 watts used for one hour. Examples: 1,000 W x 1 hr.; 100 W x 10 hrs.; 50 W x 20 hrs.)

CALCULATING OPERATING COST OF APPLIANCES

1. Estimate the number of hours the appliance is used during the day.
2. Multiply the hours used by the wattage of the appliance.
3. Divide by 1000 to get the kilowatthours used.
4. Multiply kilowatthours by the rate per kilowatthour to find the approximate cost.

EXAMPLE:

Color television = 240 watts

$$\frac{240 \text{ watts} \times 5 \text{ hours used}}{1000} = \frac{1200}{1000}$$

1.2 KWH x 7.0¢/KWH* = 8.4¢ for 5 hours a day

*Average current residential rate is 7¢/KWH.

YOU'RE MOVING TO A NEW EARTH!!

IMPLEMENTATION:

1. Begin the lesson by discussing the need for energy in our homes for cooking, heating, light, refrigeration, entertainment, etc.

2. Define wattage, and discuss that appliances have various wattages i.e., blow dryer = 1000 watts.

3. Explain to the students that they will be playing a game today, in which they will be transported to another plante just like earth. They will be divided into families. Read the story on the worksheet.

4. Divide the studnets into groups of 4-5. Have them choose a group leader and group reporter.

5. Remind the students of the following rules:

   a). The family will need to decide on what type of heating system or fuel they will use. Remind then that this planet is very similiar to earth, and in fact the areas they are going to has the same climate as Texas. Tell then to keep this in mind when they choose their source of heat. They can use alternative energ such as solar, but keep in mind any problems or limitations. Also, they cannot heat with electricity or natural gas. (Note: they can use wood or coal if available.)

   b). Remind them that they will need to think about types of transportation, but will need to subtract appliances if they take a pickup, car, or motorcycle.

   c). The family will also need to keep in mind the fact that it's a long ways back to earth, so they may need to stockpile goods and food.

   d). Choose whatever appliances the majority of the family members agree on, but be sure to think of major activities that require appliances; i.e., cooking cleaning, etc.

   e). Each light on the wattage chart counts as one appliance.

6. After each family has completed their worksheets (about 15-20 minutes), have the reporter read off the family's results and record them on the board or butcher paper.

7. After all the family's results are posted, go back over each family's results and discuss their choices. Look for possible problems, i.e., no washing machine, no lights, etc. Don;t criticize the families but simply ask what they plan to do. Look for creative ideas or solutions for saving energy.

8. Ask the students if they see anything on the family's lists that are duplicated. Could these items be shared, and thus allow families to take other items? Example: washing machine, freezer, chain saw, etc.

9. Have the students think of things in their own home that use energy, but could be shared. Example: garden tools, lawn mowers, power tools. Mention that it not only takes energy to run many of these items, but also took a lot of energy to produce them, transport them, and merchandise them.

SOURCE: MONTANA POWER

YOUR'RE MOVING TO A NEW EARTH!!

Student Worksheet

A new planet has just been discovered! The United States has already sent a team of astronauts to it, and they've come back with amazing news. IT'S EXACTLY LIKE EARTH!! It's the same size, same atmosphere, same everything!! The U.S. Government has decided to conduct an experiment by sending families to live there, and you've been chosen to go!! You are not there to develop the planet, only to report on living conditions. You'll live the same way you do on Earth--attending school, doing chores, etc.

While the astronauts were there, they built an electrical generating plant. It's a small one that can handle only a small amount of electricity. The government has decided to let you do your own packing, but because of the amount of energy available, your family is limited to ten electrical appliances with a total wattage of 16,000.

You will be living in a four-room house with plumbing. Radio and TV waves can reach you. The climate and land is like Texas.

WATTAGES OF COMMON APPLIANCES

APPLIANCE	WATTAGE
Dishwasher	1,200
Microwave oven	1,500
Range	
Small Surface Unit	1,300
Large Surface Unit	2,400
Oven	
(nonself-cleaning)	3,200
Oven	
(self-cleaning)	3,200
Broiler Unit	3,600
Roaster	1,350
Blender	720
Coffee Maker, Automatic percolator	850
Coffee Maker, Automatic Drip	1,500
Deep Fat Fryer	1,500
Disposer	420
Fry Pan	1,150
Hand Mixer	120
Toaster	1,100
Slow Cooker - Low	75
Slow Cooker - High	150
Toaster Oven	1,400
Clock	2
Sewing Machine	75
Floor Waxer/Cleaner	350
Vacuum Cleaner	650
Clothes Dryer	5,000
Washer	
Automatic	500
Wringer Type	280
Iron (hand)	1,000
Television	
Color (solid state)	200
Black & White (solid state)	75
Hi-Fi Stereo	100
Radio	75
Radio/Record Player	110
Chain Saw	1,380
Hair Dryer	
Hard Bonnet	1,200
Hand Held	1,000
Table Lamp	100
Lawn Mower	1,200
Porch Light or Wall Light	75
Refrigerator	300
Freezer	350
Quick Recovery Hot Water Heater	9,000

WORKSHEET

Instructions:

1. Choose a group reporter.

2. Decide how your house will be heated. Depending on your choice, you may need to bring extra equipment or transportation.

   OUR HOUSE WILL BE HEATED BY _____.

Will you need transportation for your heating fuels?

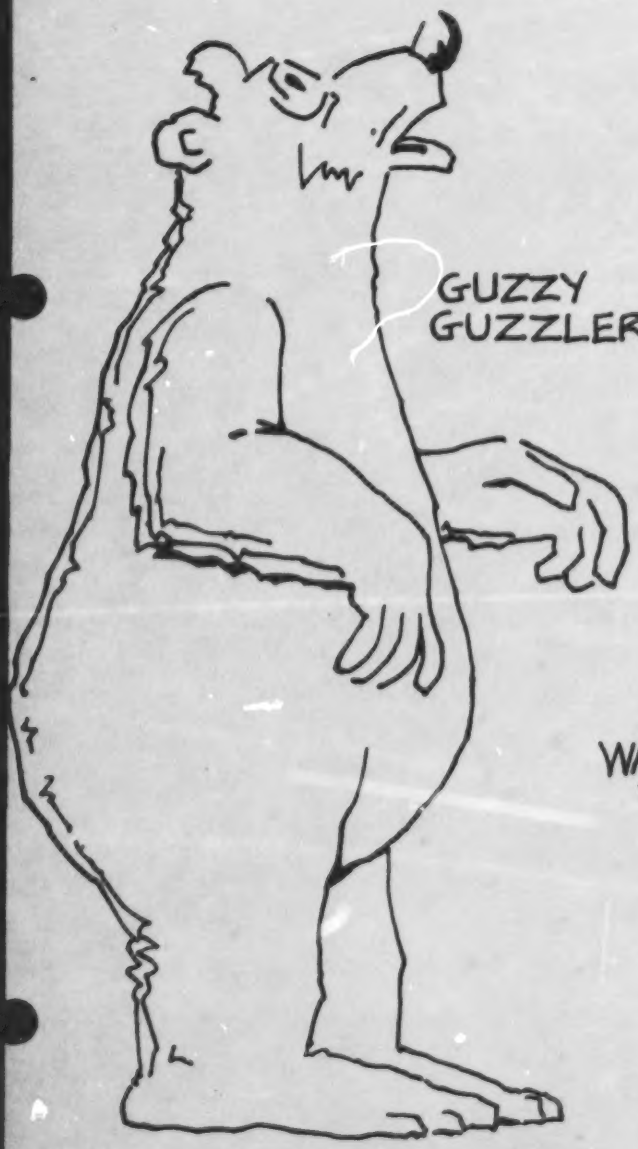
Decide which ten appliances you want to take. TOTAL WATTS CANNOT BE MORE THAN 16,000.

	Appliances	Watts Needed
1.	_____	_____
2.	_____	_____
3.	_____	_____
4.	_____	_____
5.	_____	_____
6.	_____	_____
7.	_____	_____
8.	_____	_____
9.	_____	_____
10.	_____	_____

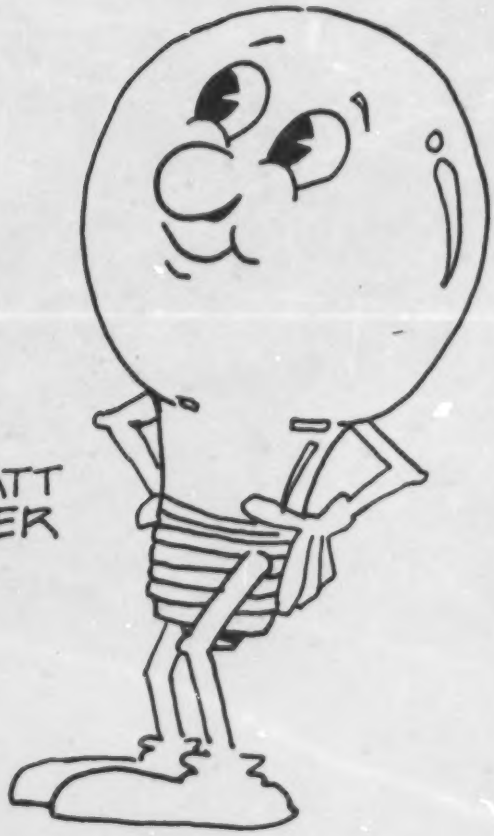
Total Watts _____

WHICH ONE ARE YOU?

SLIGHTLY SAVING SEAHORSE

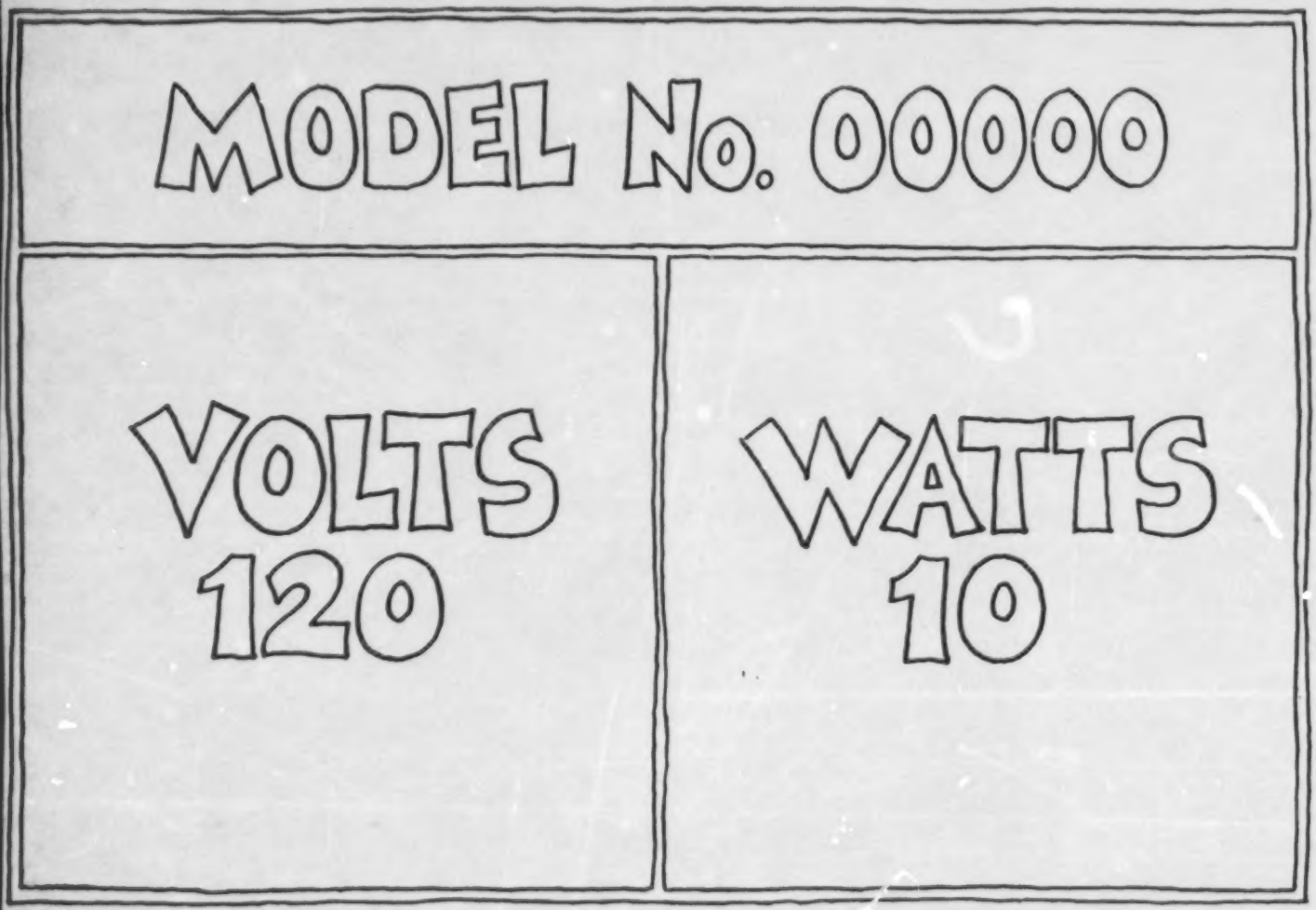


GUZZY GUZZLER



WALLY WATT WATCHER

45


MODEL No. 00000
VOLTS
120
WATTS
10

CALCULATING OPERATING COSTS OF APPLIANCES

SET 1

Calculate the cost to operate the following appliances:

	APPLIANCE	WATTS	HOURS USED	COST OF OPERATION
1.	Electric Clock	2	24	_____
2.	Clothes Washer	512	2	_____
3.	Clothes Dryer	5500	2	_____
4.	Hair Dryer	1000	1/4	_____
5.	Microwave Oven	1500	1	_____
6.	Conventional Oven	3500	1	_____
7.	Toaster Oven	1000	1/2	_____
8.	Electric skillet	1150	1	_____
9.	Vacuum Cleaner	630	1	_____
10.	Ceiling Fan	150	3	_____

KEY
SET 1

1. less than 1/2¢
2. 7¢
3. 77¢
4. 1.4¢
5. 10.5¢
6. 24.5¢
7. 3.5¢
8. 8¢
9. 4¢
10. 3¢

CALCULATING OPERATING COSTS OF APPLIANCES
Set 2

Calculate the wattage, kilowatts, kilowatthours, and cost of operation for the following appliances.

APPLIANCE #1: COLOR TELEVISION (solid state)

Color TV Model No. _____

Volts	Watts
120	200

Calculate the cost to operate this color TV for 10 (ten) hours.

1. Amount of wattage: _____
2. Amount of Kilowatts: _____
3. Amount of Kilowatthours: _____
4. Cost of Operation: _____

APPLIANCE #2: DISHWASHER

Dishwasher Model No. _____

Volts	Amps
120	10

Calculate the cost to operate this dishwasher for one hour each day for a total of five days.

1. Amount of wattage: _____
2. Amount of Kilowatt: _____
3. Amount of Kilowatthours: _____
4. Cost of Operation: _____

APPLIANCE #3: TABLE LAMP

Lightbulb _____

Volts	Watts
120	100

Calculate the cost to operate a table lamp with a 100 watt lightbulb for 10 hours.

1. Amount of wattage: _____
2. Amount of Kilowatts: _____
3. Amount of Kilowatthours: _____
4. Cost of Operation: _____

ADDITIONAL SUGGESTIONS:

At home check the labels of several appliances and calculate the wattage and kilowatts for these appliances. Ask your parents how many hours they think they use these appliances per week (or per month) and calculate the costs.

NOTE: The formulas given do not work on thermostatically controlled appliances such as freezers, such as ovens, electric heaters, and refrigerators because they do not always draw the same number of watts all the time they are operating.

CALCULATING MONTHLY ENERGY COSTS FOR APPLIANCES

Set 3

In Set 3 you will trackdown appliances you use every month in your home and calculate the cost to run these appliances each month.

First, let's review some of the terms: Define:

Watts (W): _____

Kilowatts (KW): _____

Kilowatthours (KWH): _____

Cost of Operation: _____

Listed below are various appliances used in the the home, and the amount of kilowatthours (KWH) used each month. Check those appliances you use in your home and then calculate the cost to "run" those appliances each month. The average GSU current residential rate is 7¢ per KWH. Check with your local utility on the current average rate.

APPLIANCE AND WATTAGE	AVERAGE USE	MONTHLY KWH		COST/KWH	ESTIMATED MONTHLY COST
REFRIGERATION:					
REFRIG/FREEZER-(12-15 cu. ft. Manual Defrost-325 watts)	Everyday	90	KWH X	_____ =	_____
REFRIG/FREEZER-(14-cu. ft. Frost-free) (615 watts)	Everyday	140	KWH X	_____ =	_____
REFRIG/FREEZER-(22-26 cu. ft. Side-by side).	Everyday	190	KWH X	_____ =	_____
FREEZER (15 cu. ft. Manual defrost-340 watts, chest)	Everyday	90	KWH X	_____ =	_____
FREEZER (15 cu. ft.) (Frost-free, 440 W)	Everyday	150	KWH X	_____ =	_____
FOOD PREPARATION:					
MICROWAVE OVEN (1500 watts)	20 min./day	15	KWH X	_____ =	_____

OVEN (3500 watts) (regular use)	Everyday	39	KWH X	_____	=	_____
OVEN (12200 watts) Use of self-cleaning feature	Once a Month	4	KWH X	_____	=	_____
TRASH COMPACTOR	Once a day	.1	KWH X	_____	=	_____
HAND MIXER (120 watts)	3 times	.1	KWH X	_____	=	_____
SLOW COOKER (70 watts)	twice a month	3	KWH X	_____	=	_____
WAFFLE IRON (1200 watts)	Once a week	2	KWH X	_____	=	_____
CORN POPPER (575 watt)	Twice a week	1	KWH X	_____	=	_____
ROASTER (1425 watts)	Once a month	5	KWH X	_____	=	_____
COFFEMAKER (660 watts) Auto. Percolator	Once a day	7.5	KWH X	_____	=	_____
COFFEEMAKER (1600 watts) Automatic Drip	Once a day	5.4	KWH X	_____	=	_____
DISPOSER (460 watts)	Everyday	.54	KWH X	_____	=	_____
DISHWASHER (1200 watts)	Everyday	120	KWH X	_____	=	_____
CARVING KNIFE (95 watts)	Twice a week	1	KWH X	_____	=	_____
ELECTRIC GRIDDLE (1500)	Twice a week	4	KWH X	_____	=	_____
TOASTER OVEN	8 hrs./month	4	KWH X	_____	=	_____
LAUNDRY:						
IRON (1000 watts)	4 hrs./month	5	KWH X	_____	=	_____
SEWING MACHINE (75 watts)	4 hrs./month	3	KWH X	_____	=	_____
FLOOR WAXER/CLEANER (350 watts)	2 hrs./month	.5	KWH X	_____	=	_____
WASHER (512 watts) (Automatic-motor only)	20 loads/month	6.6	KWH X	_____	=	_____
VACUUM CLEANER (630 watts)	6 hrs./month	3.75	KWH X	_____	=	_____
DRYER (5500 watts)	20 loads/month	60	KWH X	_____	=	_____

HOME ENTERTAINMENT:

CLOCK (2 watts)	Continuous	1.4	KWH X	____	=	_____
RADIO (109 watts)	2 hrs./day	11.25	KWH X	____	=	_____
COLOR TV (solid state) (145 watts)	5 hrs./day	26	KWH X	____	=	_____
BLACK/WHITE TV (solid state - 45 watts)	5 hrs./day	6.75	KWH X	____	=	_____
STEREO (120 watts)	3 hrs./day	11	KWH X	____	=	_____

PERSONAL CARE

CURLING IRON (40 watts)	Once a day	.3	KWH X	____	=	_____
ELEC. SHAVER (15 watts)	Once a day	.03	KWH X	____	=	_____
BLOW DRYER (1000 watts)	5 times/week	7.5	KWH X	____	=	_____
HAIR BLOWER (Bonnet model - 400 watts)	45 min./week	1	KWH X	____	=	_____
HAIR CURLERS (400 watts)	45 min./week	7.5	KWH X	____	=	_____
SUN LAMPS (290 watts)	10 min a day	1	KWH X	____	=	_____

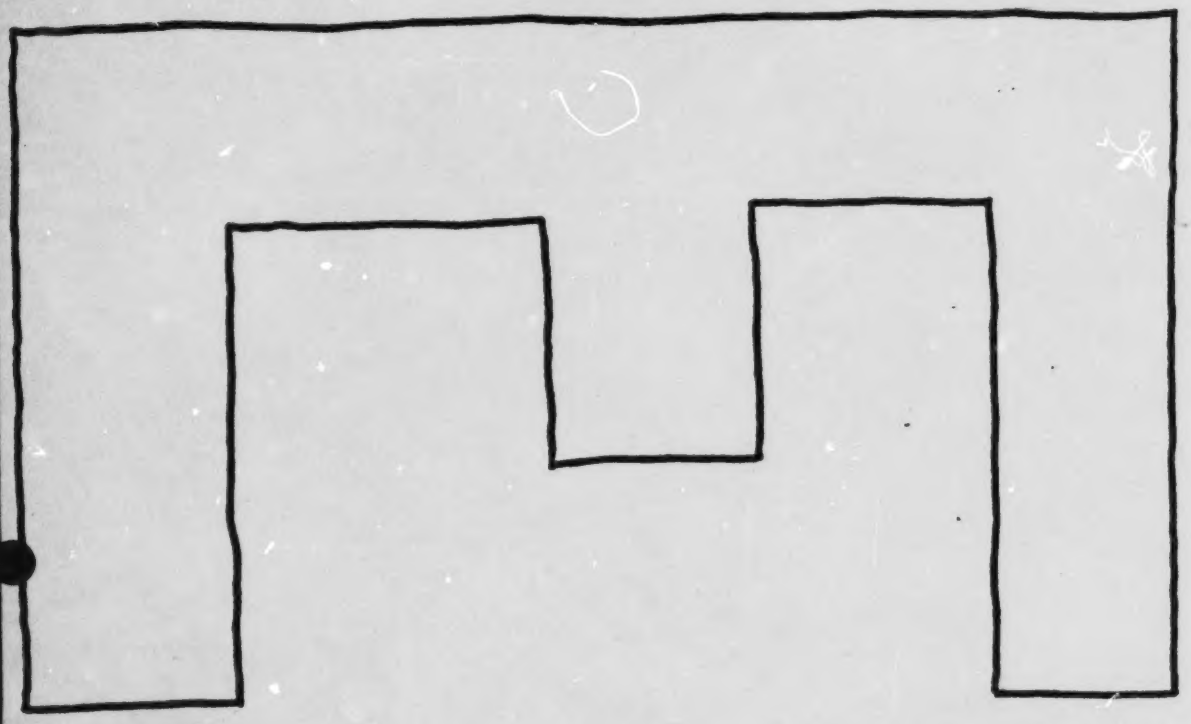
MISCELLANEOUS:

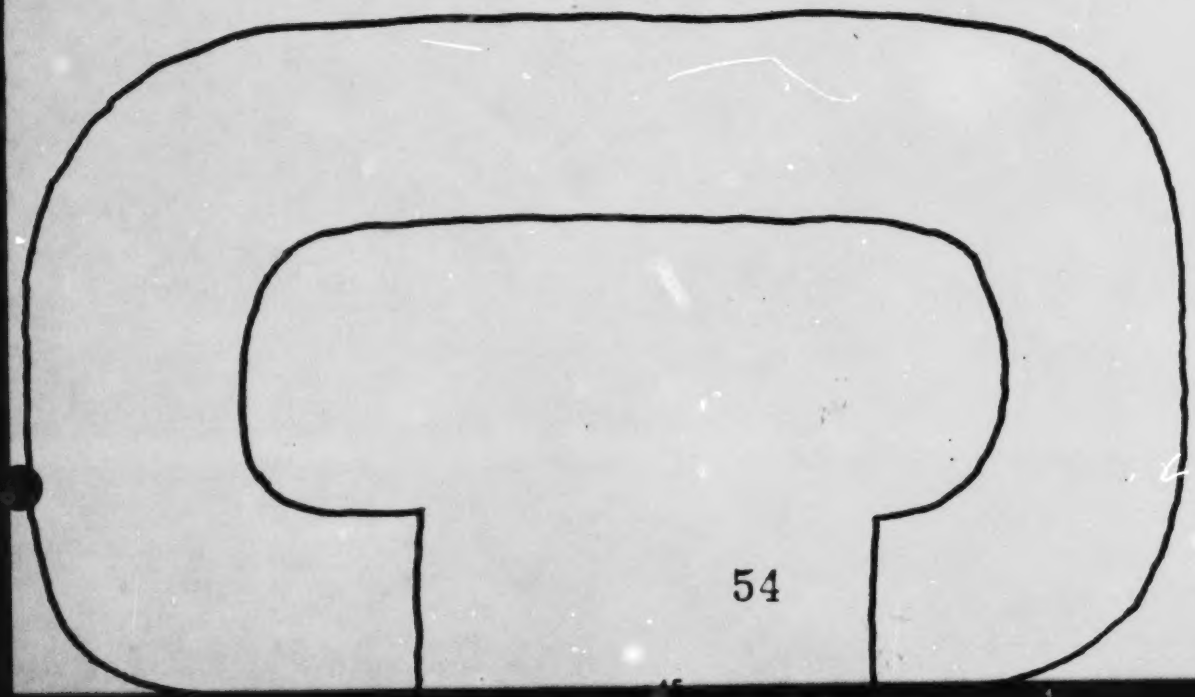
ELECTRIC BLANKET (117 watts)	Everynight	22	KWH X	____	=	_____
HUMIDIFIER (177 watts)	Everyday	14	KWH X	____	=	_____
WINDOW FAN (200 watts)	2 hrs./day	14	KWH X	____	=	_____
GARAGE DOOR OPENER (1/3 horsepower)	4 times/day	.3	KWH X	____	=	_____
WATER HEATER (4500 W)	Continuous	500	KWH X	____	=	_____
ADD FOR CLOTHES WASHER		108	KWH X	____	=	_____
ADD FOR DISHWASHER		80	KWH X	____	=	_____
ADD FOR EACH PERSON OVER 4		50	KWH X	____	=	_____

TOTAL ALL THE APPLIANCE COSTS YOU HAVE CALCULATED FOR THE MONTH _____

What are results? Compare this figure to an actual electric bill?

Pass out white or colored paper in the shape of E's and C's. Have student write down 10 completion sentences on "Energy Conservation Is..." on their letter. Discuss. Take these up to make into bulletin board entitled "Energy Conservation Is..." (These could also be placed on the wall.)



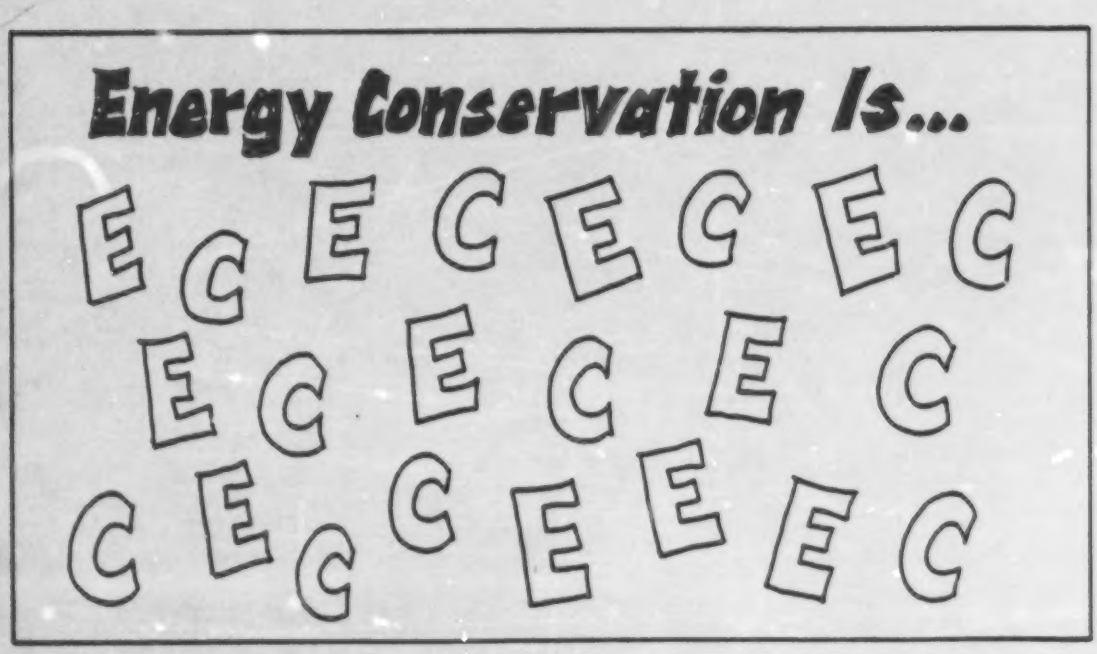


Bulletin Board Idea

Energy Conservation Is...

1. Use E's and C's. Place at random on bulletin board. This activity creates more interest and allows other classes to view thoughts.

2. A blank classroom wall may be used to allow more space when several classes are studying the unit.



WHIZ KIDS TAKE THIS ENERGY QUIZ

Think you know all the answers when it comes to conserving energy? Test your knowledge by checking the answer you feel is correct for each of the following questions. Then rate yourself according to the formulas given at the end of this article.

1 Who uses least energy for 10 minutes in the morning?
___a) A guy who shaves with an electric razor
___b) A girl who switches on a hand-held hair dryer
___c) A mother who brews coffee in an electric coffee maker

2 Which gives most light with least energy consumption?
___a) A 40-watt fluorescent bulb
___b) A 100-watt incandescent bulb
___c) Two 60-watt incandescent bulbs

3 How much does peeking into a hot oven drop the temperature?
___a) 5 degrees
___b) 10 degrees
___c) 25 degrees

4 Given one hour of cooking time, which uses least energy?
___a) Oven
___b) Top-of-the-range broiler
___c) Broiler

5 Which is most efficient?
___a) A full freezer instead of one that's half full
___b) A full refrigerator instead of one that's half full
___c) A refrigerator set at its coldest setting

6 Which appliance uses most wattage?
___a) Popcorn popper
___b) Toaster
___c) Waffle iron

7 A saucepan with a base 3 inches in diameter would best be placed on a:
___a) 4-inch burner
___b) 6-inch burner
___c) 3-inch burner

8 Which uses the most energy when baking for 15 minutes?
___a) Toaster oven
___b) Conventional oven
___c) Microwave oven

9 Which uses the least energy in one hour?
___a) Solid state color TV
___b) 100-watt bulb
___c) Stereo

10 To conserve energy, when leaving a room for 5 minutes, you should:
___a) Turn off all lights
___b) Leave all lights on
___c) Turn off all but one light

WHY YOU ARE RIGHT

1. *a* — Shaver: 15 watts. Hair dryer: 600 watts. Coffee maker: 600 watts.
2. *a* — A 40-watt fluorescent bulb puts out twice as much light for half the cost of a 100-watt incandescent bulb. Also, one large bulb produces more light than several smaller ones.
3. *c* — Amazing, but true.
4. *a* — Top-of-the-range units and broilers use energy during the entire cooking time. The oven uses energy only part of the hour; the rest of the time it coasts because its insulation holds heat in.
5. *a* — A full freezer enables close-fitting foods to insulate each other and help freeze more efficiently. In a refrigerator, air must be able to circulate around each container. Refrigerators should be set at 38°-40°; any colder wastes watts.
6. *c* — Popcorn popper: 575 watts. Toaster: 1100 watts. Waffle iron: 1200 watts.
7. *c* — A pot too small for the surface unit allows extra heat to escape.
8. *b* — Toaster oven: 1,500 watts. Conventional oven: 12,200 watts. Microwave oven: 1,450 watts.
9. *b* — TV: 200 watts. Bulb: 100 watts. Stereo: 180 watts.
10. *a* — Turning off lights does save energy. The notion that you have a "surge of power" when a light is turned back on, is a myth.

SCORE *8 to 10 correct, you're an Energy Whiz Kid; 6 to 8 correct, you're a Conscientious Consumer. Fewer than 6 correct, live and learn.*

SCOURCE: What's New in Home Economics, January 1974

Find-a-Word Puzzle

Try to find the words (which are listed by the side of the puzzle) in the puzzle below. When you find a word, put a circle around it and mark the word off the list so you will know when you have found them all. Answer the two questions at the bottom of the page.

C N Q X R Q D B R O I L E R T F V M Z C G
M I X E R W L N G T Q S D P R W S O P J H
Z S S R F E Q T P V P F G N V C X T T Z W
S M K M N Q F R J O E R E T S C D O H Z A
C R P D L A K R J G N T R D M N N R D H S
L H E M N O I S I V E L E T T S L C J M H
T R N F L V J M V G G D S N M F L Y P K I
L L N R P M K X L F E F W D M K C C Q G N
S Q P E L E C T R I C R A N G E F L R W G
E C T E H S W H G Q X R A C Q Z K E R G M
W K P Z D L F L R J K H D T X C G R J S A
I H G E V S H W K J K X Z P O V E N Z P C
N Y N R K X M J X M J J L L K R A D I O H
G T [illegible] K R C V A C U U M C L E A N E R A I
M R L I G H T S V Q J H W J H T N H R I N
A L S A J T V G M V N W H N D X K P X R E
C J L C W A T E R H E A T E R Z F C G C Q
H D D K F N G F H Q W R X S Y G Z H Z O D
I A P K N M M L K H D R W J E G P L C N C
N R I M N H T O A S T E R G R A T Z R D F
E P L R R X G S W S T M C F R V M E F I N
V D F T D H L N J E D G P G X N H W D T X
K V L P M R N D G M R L O Z K S Q W V I P
K Q S R C S Y N W T F N X V A W F X P O Z
W N Z D P X A E Q Y O R G W S C T Z V N C
M J F H I R O N R H V G H H Z R J Z K E X
C R J P S R Q H P N G S D M D Q S L D R C
L S D A U T O M O B I L E Z F T X C Z V W
T K G C J G V H C D G T F S T D R W V C Q

Things Around the Home That Use Energy

air conditioner, automobile, blender, broiler clock, dishwasher, dryer, edger, electric range, freezer, gas range, hair dryer, iron, lawn mower, lights, mixer, motorcycle, oven, phonograph, radio, refrigerator, sewing machine, stereo, television, toaster, vacuum cleaner, washing machine, water heater, and fan

What energy-using devices are around your home that were not around your grandparents' home? Your great-grandparents' home?

SOURCE: ENCORE, Dept. of Industrial Education, Texas A & M University.

Find-a-Word Puzzle

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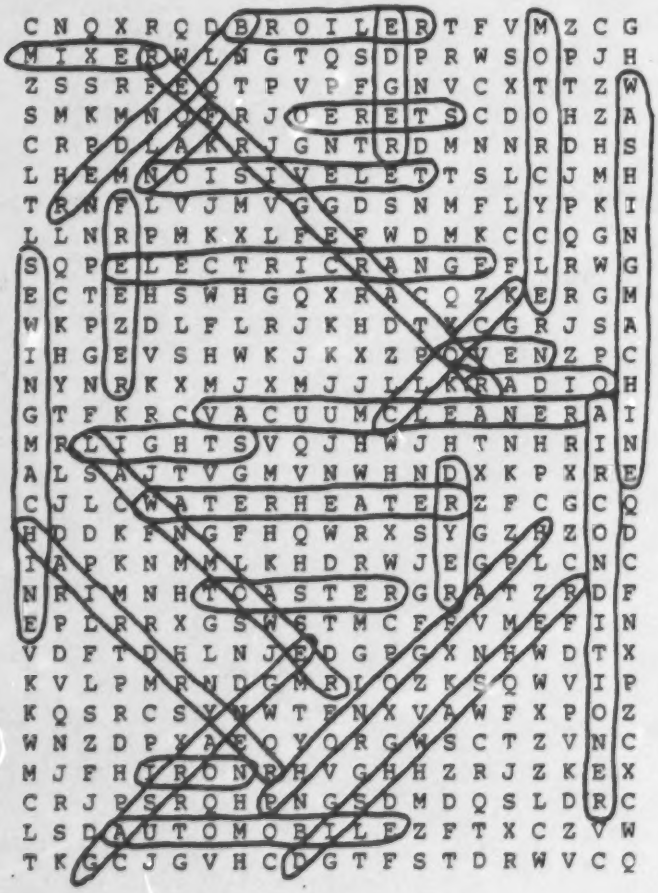


Things Around the Home That Use Energy

air conditioner, automobile, blender, broiler clock, dishwasher, dryer, edger, electric range, freezer, gas range, hair dryer, iron, lawn mower, lights, mixer, motorcycle, oven, phonograph, radio, refriggerator, sewing machine, stereo, television, toaster, vacuum cleaner, washing machine, water heater, and fan

What energy-using devices are around your home that were not around your grandparents' home? Your great-grandparents' home?

SOURCE: ENCORE, Dept. of Industrial Education, Texas A & M University.

FEATURES TO LOOK FOR IN SELECTION OF ENERGY EFFICIENT APPLIANCES

I. RANGE
   A. Electronic Ignition (Gas)
   B. Electric - Self-cleaning - more insulation
   C. Glass windows - reduce peeking
   D. Coil size selection of surface units
   E. Oven - microwave/convection/conventional

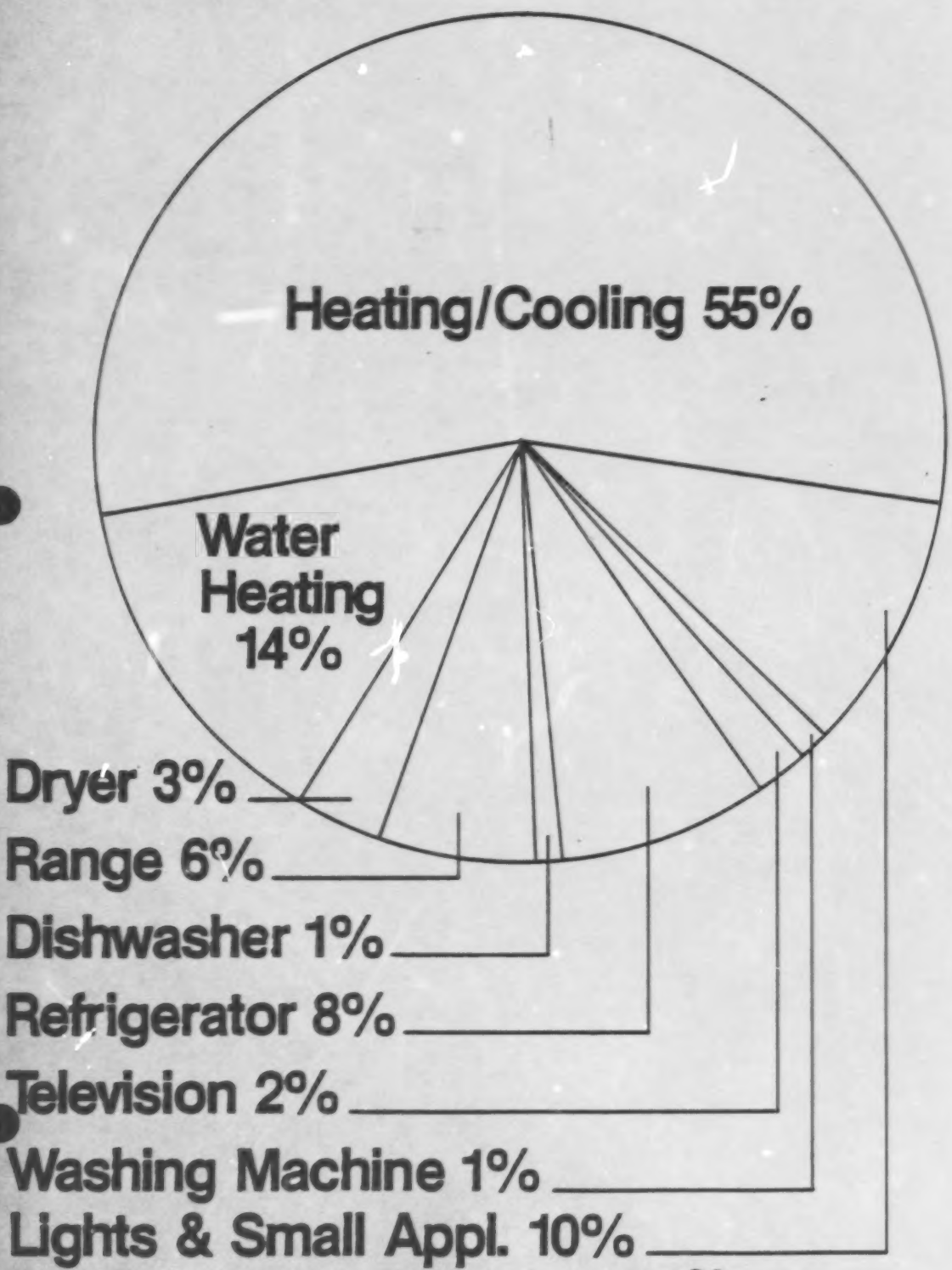
II. REFRIGERATOR/FREEZER
   A. Size
   B. Foam - insulated cabinets
   C. Energy Saver Switch
   D. Operating costs (Energy Guide Label)
   E. Location of condenser coils for ease in cleaning.

III. DISHWASHER
   A. Air dry selector (Power Saver)
   B. Short cycle selector
   C. Water heating feature
   D. Energy Guide Label operating cost

IV. WASHER
   A. Water level and temperature control
   B. Sudsaver feature
   C. Water usage
   D. Energy Guide Label

V. DRYER
   A. Moisture sensor
   B. Variety of settings
   C. Operating costs
   D. Easy to reach lint filter
   E. Electronic ignition (gas)

Average Annual Energy Use By Appliance



℞

DR. KILO WATT
40 ENERGY DRIVE
CONSERVATION, TEXAS

ATTACH ENERGY TIPS TO PRESCRIPTION BLANK
CHANGE DAILY

FAMILY ENERGY SAVING TIPS FOR THE HOME

Below are some of the possible ways your family can save energy around the home. Place a check mark next to each items that you try.

SPACE HEATING

_____ Your can save 12% on your annual heating bill by lowering your thermostat from 75°F (21°C) to 68°F (20°C) during the day and from 68°F (20°C) to 65°F (18°C) at night.

_____ Don't be a thermostat fiddler. Switching room temperature back and forth a lot wastes fuel.

_____ An open fireplace chimney damper may let 20% of the heat in a house escape. Open the damper only when using the fireplace.

_____ In extremely cold weather, fireplace fires draw more heat up the chimney then they give off into a room. Fireplaces are most efficient on those "in between" days.

_____ Increased humidity makes the air seem warmer. If your home does not have a humidifier, consider placing pans of water near registers or radiators. (Especially important in colder climates.)

_____ Close doors and turn off heat in rooms being ventilated or which are not in use.

_____ Make sure there are no obstructions, such as rugs, furniture or draperies, around radiators or heating air vents.

_____ If you have gas heat, shut off the pilot when the heating season ends.

_____ Check for air leaks around windows and doors on a windy day. Seal with weatherstripping and caulking.

_____ If you like to sleep with an open window, close your bedroom door. This will retain heat in other rooms in the house.

_____ Close drapes and pull shades at night and on cloudy or windy days during winter. Open shades and drapes on the sunny side of the house only. Keep in mind that very little sunlight comes in from the north and west windows in winter, but cold winds come from this direction.

_____ Check the systems filter once a month, whether it is a central unit or window air conditioner unit. Filters serve to keep the system free of lint, dust and grease. A dirty filter causes a heating or cooling system to work harder, thereby using more energy and increasing the possibilities of an expensive breakdown. Never operate the equipment without a filter.

_____ Lower your winter thermostat to 55°F (13°C) when you're going to be away for a day or longer.

_____ Storm windows will cut in half the heat that is needlessly lost through the windows in your house. If you can't install storm windows, install clear plastic sheeting at least 6 ml. thick.

_____ Have heating equipment checked, cleaned and adjusted for top efficiency.

_____ Add insulation in ceilings and walls if needed.

_____ Insulate heating ducts running through unheated spaces.

_____ Never use the oven of the range for heating the house. Ovens use a great amount of electricity, 3500 watts and heats a very small area. Electric or gas, this is a dangerous way to heat the home.

SPACE COOLING

_____ Keep thermostat at 70°F during the summer and set it substantially higher if you are going to be away for a large part of the day. Turn off the air conditioner if you are going to be away from home for more than 24 hours.

_____ Ventilate high moisture areas such as bathroom, laundry room and kitchen. Humid air makes you feel warmer than dry air.

_____ Keep your air conditioner filters clean, and don't block the unit with drapes or furniture.

_____ Keep draperies closed on the sunny side of the house.

_____ A ventilating fan will exhaust the extreme heat in an attic. Turn on the fan only when the sun's rays are directly on the roof, or use one governed by a thermostat set at 110°F (43°C).

_____ Use fans to help circulate air. Fans make you feel about 10°F cooler and use little energy.

_____ Keep the compressor or cooling knob of a window air conditioner on the lowest possible setting.

_____ If using window air conditioners, close off any rooms not in use during the day.

TOILETS/WATER USE

_____ A water-filled, capped bottle (quart size) in a toilet's water tank, or an adjustment of the float level reduces the normal 4.1 gallons of water to flush a toilet.

_____ A toilet leak can waste lots of water. Put a few drops of food coloring in your tank. If colored water shows in the bowl without flushing, there's a leak and repairs are needed.

_____ Avoid using the toilet as a trash basket. Tissues should go in the waste basket and cigarette butts in the ashtray.

_____ Install flow control devices for faucets. A flow restrictor can cut the flow of water from 10 gallons to 2-3 gallons per minute.

_____ Use cold water instead of hot for household cleaning.

_____ Repair leaky hot water faucets. One drop a second can waste as much as 60 gallons of water in a week.

_____ Cut off the water heater if you plan to be away from for an extended period of time such as all day. It take about 30 minutes to 1 hour for the water to heat for use.

_____ Run dishwasher only on full loads.

_____ Rinse dishes with cold water before putting them in dishwasher.

_____ Do your showering and hair washing in one step. It takes less water than doing the hair separately.

_____ Turn water off in shower while lathering, shaving legs, etc., and turn on to rinse.

_____ When washing dishes by hand, use a dishpan or stopper in the sink so you won't need to run the hot water continuously.

_____ When brushing teeth or shaving, run the water only when needed rather than continuously. (This also works with showers. Get wet, turn water off, lather up and rinse!)

_____ One leaky faucet can waste up to 2,200 gallons of water a year - enough to quench your thirst with 35,200 glasses of water (8-oz. size). It may only require changing the washer of the faucet. (You will not only be saving the energy needed to heat the water but the energy needed to pump the water to your house.)

KITCHEN (COOKING-RANGE)

_____ Cook with the oven whenever possible. It is more efficient because oven heating elements are not on all the time, as they are in surface units.

_____ Preheat oven only for baking...and no more than 6 minutes. Preheating for meats is unnecessary.

_____ Try to keep from peeking in the oven. Every time you open the door, you lose 25% of your heat and cooking time is increased.

_____ Reduce oven temperature by 25°F when baking in glass or ceramic utensils. They absorb heat and baking is faster.

_____ On surface units, use utensils with flat bottoms and tight-fitting covers and use the right size for burner---a small pan on a large burner wastes heat.

_____ Turn off surface units of an electric range a short time before food is done. Food will continue cooking from its own heat and that stored in coils.

_____ Start with hot tap water when you need water for boiling, and a major part of the heating will already be done.

_____ On the top of the stove, use the lowest temperature needed. Foods won't cook any faster with the temperature turned all the way up. Turn down to lower temperature or to simmer liquids reaching boiling point.

_____ Use small electric pans or ovens (if you have them) for small meals rather than the kitchen range or oven. They use less energy.

_____ Keep range-top burners and reflectors clean. They will reflect heat better.

_____ When baking, make a double quantity. Put the extra portion in the freezer for future use.

_____ Preparing multiple recipes for meals like spaghetti sauce, soups and stews that take a long time to cook can save energy. The refrigerate or freeze for future use.

_____ Prepare oven meals. Cook the entire meal at one time..main dish, vegetable and dessert. Two or three dishes can be baked with little more energy than one. For example, if three dishes are to be cooked at similar temperatures (325°, 350°, and 375°) pick the average temperature (350°) and cook all three, making a small allowance in cooking time. The oven (which is more efficient than the range top) can be used in this manner to prepare the entire meal.

_____ By dividing a skillet with foil inserts, several dishes can be prepared simultaneously.

_____ Use self cleaning feature (if available) immediately after use while the oven is still hot. The energy cost for using the self-cleaning feature is a fraction of the cost of buying oven cleaner.

_____ Use self cleaning feature at night or early morning, when electricity demand is lower.

_____ Self cleaning ovens prevent heat loss due to better insulation.

_____ Bake or roast early in the morning, so excess heat will not be added to the house during the hottest part of the day.

_____ Keep the oven interior clean.

_____ Never use oven or surface units to heat room.

_____ Check oven door gaskets for leakage.

_____ Rearrange oven shelves before turning oven on.

_____ Thaw foods before cooking.

KITCHEN (COOKING-SMALL APPLIANCES)

_____ Use small appliances rather than the range or oven. They can do the same job without using as much energy, and do not add as much heat to the house as the oven does.

_____ Use the electric skillet in place of the oven for cooking casseroles, baking potatoes, cakes, apples, and for pan broiling and braising. Other dishes which can be prepared in the skillet include baked beans, spaghetti sauce, candies, skillet cookies and vegetables. The electric skillet uses approximately 1500 watts compared to the oven which uses 3500 watts.

_____ Use the toaster oven rather than the oven. Toaster ovens can be used for baking potatoes, breads and frozen dinners.

_____ Percolators, beverage makers and egg cookers use approximately half the energy the range uses.

KITCHEN (REFRIGERATION)

_____ Try to open and close the refrigerator/freezer door less often by removing several items at once.

_____ Always let hot food cool for a short time at room temperature before placing in refrigerator. However, don't let food stand too long; bacterial growth can make it unsafe.

_____ Set refrigerator temperature at 37-40°F (3-4°C), freezer at 5-10°F (-15 to -12°C).

_____ Check to see that gaskets around refrigerator and freezer doors are tight.

_____ Defrost manual-defrost freezer regularly. Never allow more than 1/4 inch of frost to accumulate as this will reduce the freezer's efficiency. Although automatic defrost freezers use more energy, if a manual-defrost freezer builds up too much frost, it will use just as much energy.

_____ Clean the condenser on your refrigerator at least twice a year---dust on the coils and the condenser makes the refrigerator work harder.

_____ Open doors only when necessary for as short a period of time as necessary. When warmer air enters the refrigerator, the refrigerator has to use more energy to cool down again.

_____ Allow food to cool first before placing in the refrigerator.

_____ Keep the freezer compartment full so it cannot take in warm air each time the door is opened. Freeze Milk cartons filled with water to take up space.

_____ Leave space between food items in the refrigerator so the air can circulate.

_____ Read "Use and Care" manual.

_____ Locate appliances away from direct flow of warm air (heat producing appliances such as dishwasher, range).

____ Use the Power Saver Switch for turning off electric heaters when humidity is low or if refrigerator is located in room with low humidity. The electric heaters are to keep condensation from forming in doorsill areas ir humid weather.

_____ In the summer, make a large thermos or jug of ice water. Leave in a convenient place. This cuts down on opening the refrigerator door.

KITCHEN (DISHWASHING)

_____ Don't use the "dry cycle" on your dishwasher and save one-third of the energy used for a complete cycle.

_____ Always wait until you have a full load before running your dishwasher.

_____ Use the "short cycle" or "light wash" if your dishwasher is equipped with one.

_____ Load dishes according to manufacturer's "Use and Cre" manual. Improper loading can result in poorly cleaned dishes that have to be rewashed

_____ Wash full loads. Be careful not to overload the unit or block the circulation of water. Consult the operation manual.

_____ Washing dishes by hand uses more water than a dishwasher: 9 to 14 gallons of hot water are used for hand washing one meals' dishes, while 11 to 16 gallons are used for a dishwasher load. (3 meals).

_____ Use cold water if pre-rinsing is needed. Newer models usually do not require prerinsing.

_____ Use energy saver cycle or cut off the drying cycle and let the dishes air dry. Open the door for air drying. Use dishwasher power-saver switch, which can cut off approximately 8 percent of the total energy consumption (both hot water and operational energy).

_____ Use only detergent designed for automatic dishwashing. Other cleaning agents can block the washing action, causing overflow and requiring a second wash cycle.

_____ Use proper amount of detergent. Too little detergent results in poorly cleaned dishes, which would require running the dishwasher through another cycle.

_____ Dishwasher drains and filters must be kept clear of debris so as not to reduce efficiency or cause overflow.

_____ Use the shortest washing cycle that will clean your dishes.

_____ Always follow the manufacturer's instructions in the "Use and Care" booklet.

_____ Avoid using the rinse and hold cycle. It uses 3 to 7 gallons of hot water.

_____ On hot days, use the dishwasher at night or in the very early morning to avoid extra heat in the house during the day. Automatic timers may be attached to the dishwasher to avoid "peak load" operation (usually 2-6 P.M.) and thus to help the electric utility in its problem of meeting peak demand.

KITCHEN (WASHING DISHES BY HAND)

_____ Use two containers, one for washing and another for rinsing, to avoid an excessive use of hot water.

_____ Avoid washing dishes after each meal. Rinse dishes off with cold water and collect them until a sufficient number to warrant a full load is gathered.

_____ Allow dishes to drain dry rather than drying with a towel (air dried dishes are more germ-free than those dried with a towel) and avoid adding dish towels to the laundry (and energy) load.

KITCHEN (WASTE DISPOSALS)

_____ Use cold water when flushing food down the drain.

_____ Time the disposer use so that the dishwasher draining water will flush down the disposer.

LAUNDRY (WASHERS)

_____ Use cold water rinse for every washload.

_____ A warm water wash is the best balance between energy conservation and getting clothes clean. Save hot water for whites or heavily soiled clothes.

____ Don't underload or overload your washer---each reduces efficiency.

____ Use the recommended amount of detergent. Not using enough detergent may result in the need for a rewash to get the clothes clean.

____ Sort carefully and wash full loads.

____ Use proper water levels.

____ Select the proper wash cycle for the type of load. The Permanent Press cycle provides cool-down rinses to minimize wrinkling in "no iron" garments. Since a cool down is not necessary for regular fabrics, use the regular cycle for regular loads to conserve water.

____ Select wash time according to degree of soil.

____ Clean lint trap or filter after use.

____ Look for energy saving features when purchasing a new machine such as water level control, flexibility in cycles and wash time, availability of cold water rinses for all cycles, low water usage and sudsaver.

LAUNDRY (DRYERS)

____ Dry consecutive loads to avoid reheating the element once the dryer is warmed up. Remember to clean the lint filter after each use as collected lint cuts efficiency.

____ Separate drying loads into heavy and lightweight items. Since the lighter ones take less drying time, the dryer doesn't have to be on as long for these loads.

____ Don't overdry clothes in the dryer. It uses more energy, and some fabrics become hard to iron if the wrinkles dry in.

____ Keep lint filter clean. Check the filter before drying each load and clean if needed.

____ Do not underload or overload dryer. Each reduces efficiency. A proper washload is a proper dryer load.

____ Avoid drying small loads or single items.

____ Vent dryer to outside.

____ Remove clothes promptly when dry.

____ Check exhaust ductwork and vent regularly to make sure there are no obstructions to slow down the rate of airflow.

____ Hang clothes outside to dry (solar dryer). In most cases, you save on energy unless the clothes have to be ironed.

_____ Use the correct temperature control. Use the Regular temperature for regular or heavy loads. Use the Delicate setting only for heat sensitive items labeled "Tumble Dry Low" or "Tumble Dry Warm".

LIGHTING

_____ Turn off incandescent lights if you're leaving a room for 3 minutes or more. Turn off fluorescent lamps if you're leaving a room for 15 minutes.

_____ Use bulbs of lower wattage in halls, stairways and other areas of general illumination.

_____ Keep lighting fixtures clean.

_____ In an area where a lot of light is needed, one large bulb is more efficient than several small ones. Fluorescent is even better.

_____ Fluorescent bulbs of 40 watts produce as much light as incandescent bulbs of 100 watts, and at half the energy cost with 10 times the life. Consider replacing incandescent lighting with fluorescent in some areas.

HOUSEHOLD CLEANING

_____ Work in off peak hours. (Peak hours are from 2:00 P.M. to 8:00 P.M.)

_____ Keep cleaning equipment clean and in good working order.

_____ Check vacuum cleaner filters and bag before each use.

_____ Check belt and hose of vacuum cleaner regularly.

_____ Use dust buster or carpet sweeper between weekly vacuum cleaner jobs.

_____ Use self shining floor wax instead of electric polisher or buffer.

_____ Self cleaning ovens are efficient in that they utilize little time and energy.

_____ Adjust roller brush to rug height.

ENTERTAINMENT

_____ Don't leave the TV set, radio or stereo on when no one is interested.

_____ TV sets with an "instant on" feature use energy constantly so unplug when not in use.

PERSONAL USE

_____ Use solar energy to dry hair rather than electric.

_____ Limit the use of electrical grooming gadgets.

_____ Turn off appliances as soon as you are finished.

_____ Use iron to press clothes instead of dryer.

_____ Use electric tooth brush every other day.

_____ Use thermal blanket for warmth instead of electric blanket.

_____ Wear layers of clothing in winter instead of turning up heat.

_____ Hand wash single items instead of using washing machine.

_____ Take timed showers or partially filled tub baths.

_____ Don't run hot water when scrubbing up or shaving.

_____ In the winter, retain heat by letting bathtub water cool after bathing, so heat is released in the room.

_____ Shaving with an electric razor saves more power than letting the hot water tap run.

_____ Dry single items with solar energy.

_____ Gather clothing for following day.

_____ Place stopper in drain before turning on bath water, shaving or washing face.

OTHER IDEAS: (LIST BELOW)

I. Water Heaters and Water Usage

A. Water Heaters

1. When purchasing a water heater, match its size to the needs of your family. Oversized water heaters use more energy than necessary.

2. Heating of water continues even if hot water is not being used. Get a well-insulated hot water heater that uses as little heat as possible, minimizing the re-heating process. Set the thermostat no higher than necessary for house hold uses. This is also appropriate if an automatic dishwasher is used.

   a. Set lower when on vacation.

3. Place the water heater as close as possible to where hot water is used. Long runs of pipe cool hot water, thus increasing operating costs.

   a. If you do have long pipe runs, insulate the pipe to decrease heat loss. This also conserves water which may be wasted by letting it run until it gets hot.

4. If you have a separate waterheater for a bathroom, set it only at 110°-120° to save energy. Thus the water will be warm enough for comfort; the additional heat for sanitation is not necessary here, as for a dishwasher, etc. If your family has one water heater and also has a dishwasher, the setting should be 140°F. If there is no dishwasher, the setting would be 120°F.

5. A water heater protected by an added layer of insulation maintains water temperature longer so the water heater doesn't run as much.

B. Other Water Saving Practices

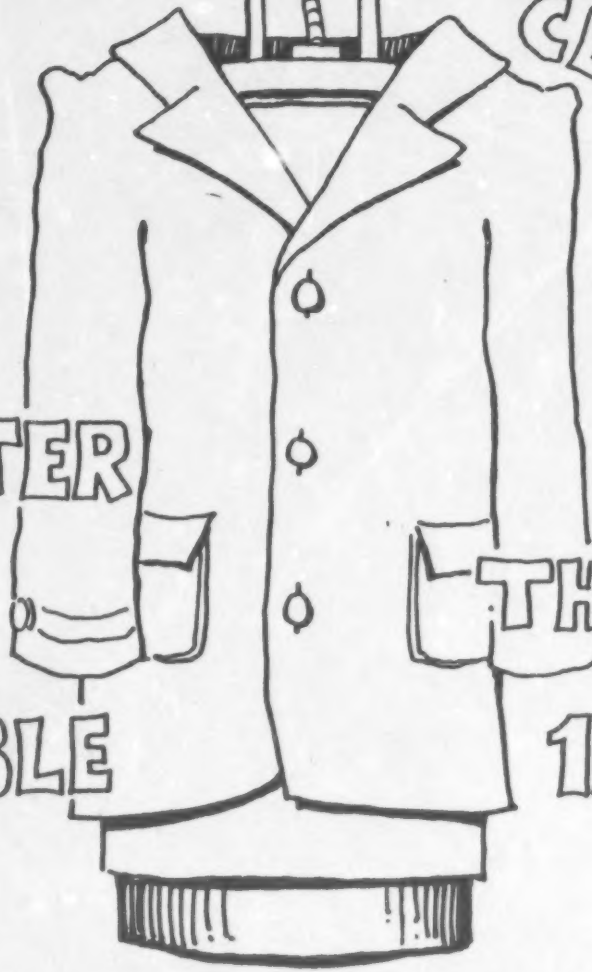
1. Showers

   a. Especially those fitted with flow restrictors or low volume heads, usually use less than a bath. But limit your stay! If you prefer a bath, refrain from completely filling the tub. A 5-minute shower uses 25 gallons. A bath uses 30 gallons, (What if you take long showers?)

SAVE 40% OF YOUR HOT WATER

USE FLOW RESTRICTORS

USE COLD WATER FOR HOUSEHOLD CLEANING



A WATERHEATER WITH AN OVERCOAT IS ENERGY SENSIBLE

LOWER THERMOSTAT TO 120°-140°

HOT WATER AUDIT

The major uses of hot water in the home are for bathing and laundry. Use the data sheet provided to estimate your family's hot water consumption for a week.

Task	Number of Times/Wk.	Multiplier (in gallons)	Quantity of Hot Water (in gallons)
Laundry loads		15	
Tub baths		25	
Showers		20	
Dishwasher loads		13	
Washing dishes by hand		5	

TOTAL: _____

Tally the number of times per week the task using hot water occurs. Then multiply the number of times by the multiplier provided. The multiplier is the average amount of hot water required for the task. The resulting value is the quantity of hot water consumed for the task. Then add the quantities for each task to arrive at an estimate of the hot water your family uses in one week. (The average household uses about 350 gallons of hot water per week.)

You can now approximate the energy required to supply this quantity of hot water.

ELECTRIC WATER HEATER

_____ gallons X .25 kwh/gallon = ____kwh

If you use ____ gallons per week, you use approximately 52 times that per year, or ____ gallons.

Calculate the energy cost for a year's consumption:

____ gallons X .25 kwh/gallon = ____kwh

This is ____kwh for one year.

Find out the rate in your area for electricity per kwh and determine the cost of one year's hot water consumption.

yearly energy consumption for hot water heater	kwh X	cents / rate kwh	= $____

GAS WATER HEATER

____ gallons X 1.3 cu. ft./gallon = ____ cu. feet

If you use ____ gallons per week, you use approximately 52 times that per year, or ____ gallons.

Calculate the energy cost for a year's consumption:

____ gallons X 1.3 cu. ft./gallon = cu. ft.

This is ____ mcf (cu. ft. divided by 1000) for one year.

Find out the rate in your area for natural gas per mcf and determine the cost of one year's hot water consumption.

yearly energy consumption for hot water	mcf X	rate/mcf	= $_____

How could you save money and energy for hot water at your house?

Some things to look for if your hot water consumption is high:

1. Check your water heater's thermostat. It should be set at 140°F or less.
2. Check for leaks.
3. Are the hot water pipes insulated?
4. Install flow restrictors and/or water saving shower heads.
5. does the water heater have an insulation blanket on it?
6. List ways your family might conserve hot water usage.

All of the figures and calculations in this activity are based on averages and estimates and do not indicate actual hot water use.

SHOWER vs. BATH

If people took short showers instead of baths or lengthy showers, a lot of energy could be saved. It takes about an ounce of oil (or a cubic foot of gas, of ¼ kilowatt-hour of electricity) to heat a gallon of water.

Compare the water used for a bath and a shower. Fill your bathtub (at the temperature and depth you like best) and measure the depth with a yardstick (when you are out of the water). Record the depth: ____ inches. At your next bathing time, take a shower in the same tub. Keep the drain closed during your shower, but be careful not to overflow the tub. (Do not rush your shower; take your time!) This time, record your bathing time as well as the water depth.

Beginning Time _____ Ending Time _____

Duration of Shower _____ Water Depth _____

If you took a short shower, it should have required only about half as much as water as your bath.

Questions

1. What bathing practice is more conservative for you?

2. What would be the energy impact of taking a 20-minute shower?

3. What are some other ways to conserve energy while bathing?

Suggestions

1. If your shower was lengthy you may need to measure the depth, empty the tub and then finish your shower and measure again. Add the two depths.

2. Investigate the bathing practices of other members of your family. Who is most conservative?

WASTE AND SAVE GAME

Divide the class into two teams and ask each team, in turn, the following questions. They are to answer "waste" or "save" for each situation.

1. Cook extra food each time you use the oven. SAVE
2. Wash dishes in the dishwasher after every meal or snack. WASTE
3. Place the refrigerator next to the stove or by the radiator. WASTE
4. Avoid opening the door of the refrigerator frequently. SAVE
5. Turn dishwasher off right after final rinse and air-dry dishes. SAVE
6. Use flat-bottom pans and cover them to speed cooking time. SAVE
7. Buy frozen and processed food and food wrapped in plastic and aluminum foil. WASTE
8. Let frost build up over 1/4 to 1/2 inch thick. WASTE
9. Vacuum coil of refrigerator twice a year. SAVE
10. Put hot foods in refrigerator or freezer. WASTE
11. Keep freezer full. SAVE
12. Start with high heat setting and turn down to complete cooking time. SAVE
13. Turn oven off a few minutes early. SAVE
14. Use oven or surface units to heat room. WASTE
15. Prerinse dishes before putting them into dishwasher. WASTE
16. Air dry dishes. SAVE
17. All dishwasher need 160° water to wash dishes properly. WASTE

* Note to teacher: May also be used as a handout.

May also distribute blue and red cards with "W" or "S: on them. Teacher recites items out loud and student raises appropriate card.

PERSONAL USE APPLIANCES

Circle appliances that You use in your home.

1. Hairdryer
2. Electric rollers
3. Foot massager
4. Electric razor
5. Television
6. Electric blanket
7. Electric tooth brush
8. Radio
9. Make-up mirror
10. Iron
11. Facial massager
12. Sun lamp
13. Desk lamps
14. Video games
15. Heating pad
16. Electric shoe buffer
17. Washing machine
18. Curling iron
19. Typewriter
20. Calculator
21. Manicure set
22. Stereo
23. Clothes dryer
24. Electric clock
25. Water pik

ENERGY USE AND ABUSE CHART

Choose examples of items used daily for your personal care. Answer the questions in each column according to your situation.

Energy - Consuming Item	Why is this item convenient for you?	What function does this item serve in your life?	How can the item be more energy efficient	What changes in lifestyle would make the item less important to you?	How can other people help you change?
Example:					
Electric Hair Rollers	provides less time for setting hair	cuts down on grooming time	don't use daily turn off when not used	blow hair cut	help you plait your hair; get a wash & wear permanent

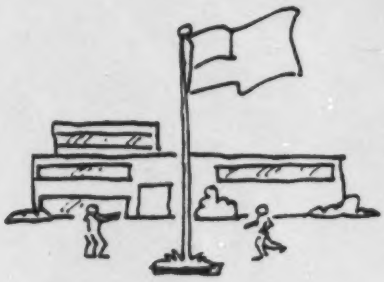
THERE ARE OTHER WAYS TO GET FROM HERE TO THERE

SHOPPING CENTER

1. _____
2. _____
3. _____

YOUR TOWN

YOUR SCHOOL



1 _____
2. _____
3 _____

YOUR HOUSE

PARENT'S
PLACE OF BUSINESS

1. _____
2. _____
3. _____

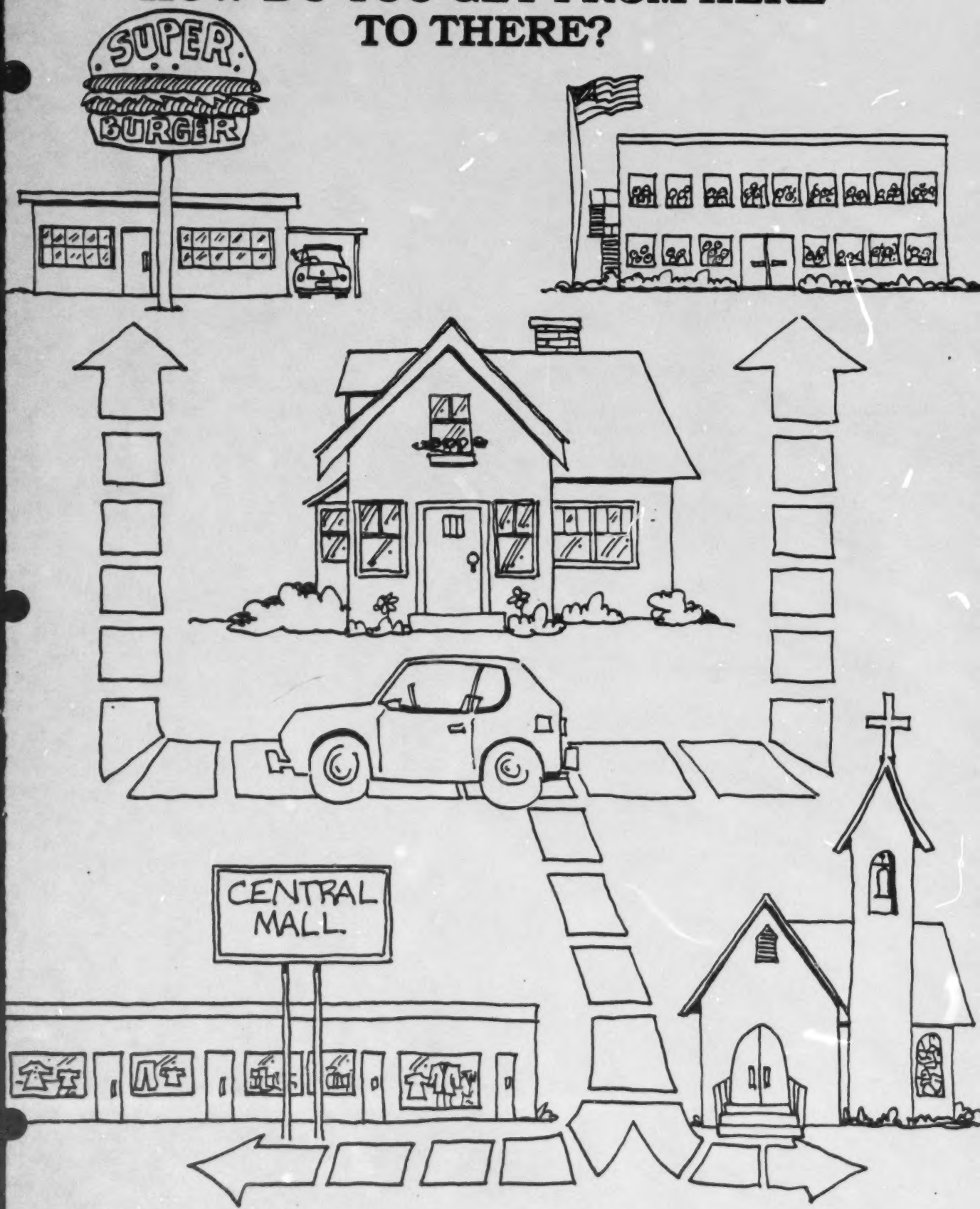
FAVORITE
RESTAURANT

1. _____
2. _____
3. _____

FRIEND'S HOUSE

1. _____
2. _____
3. _____

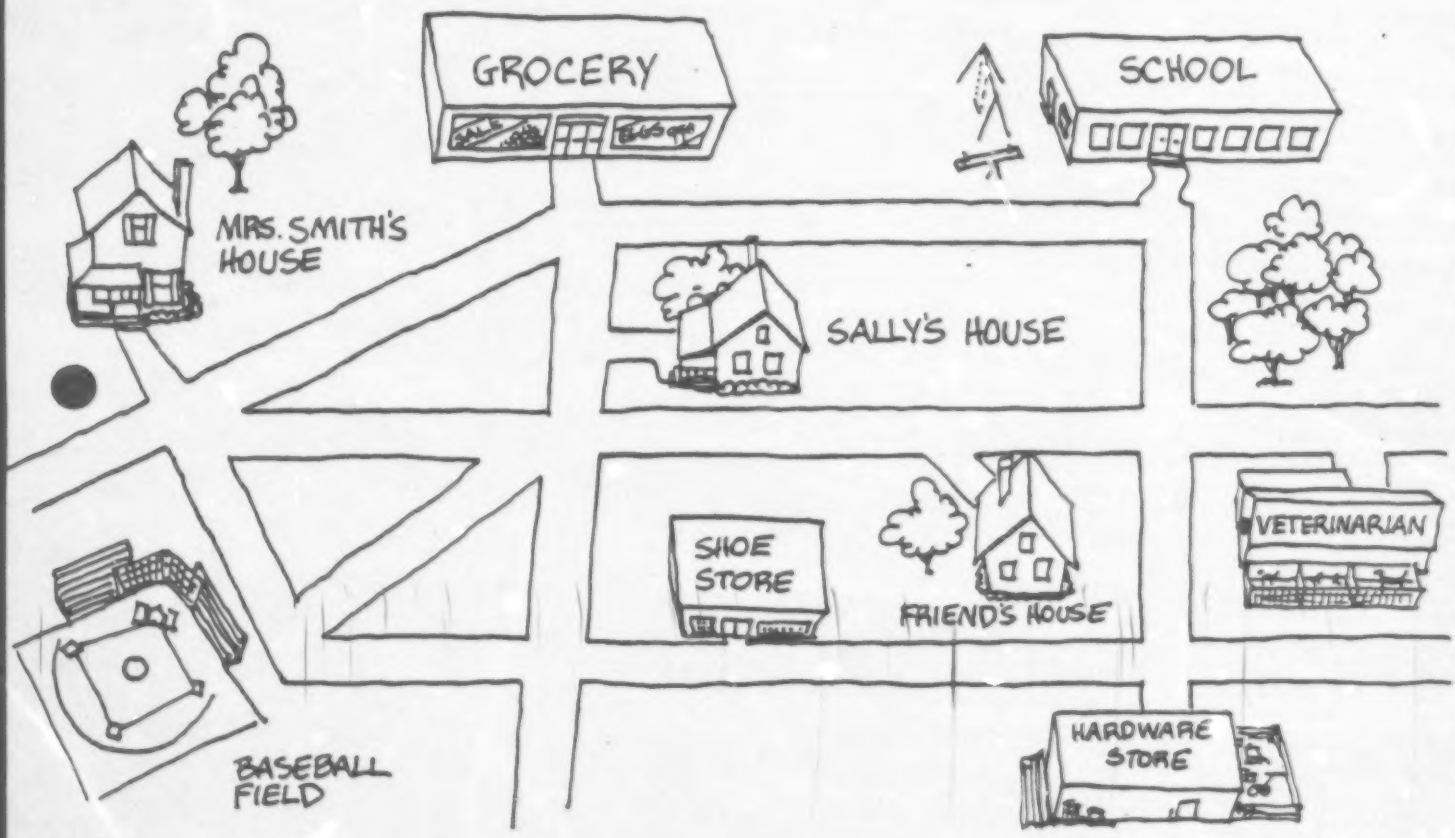
HOW DO YOU GET FROM HERE TO THERE?



MRS. SMITH'S SHOPPING TRIP

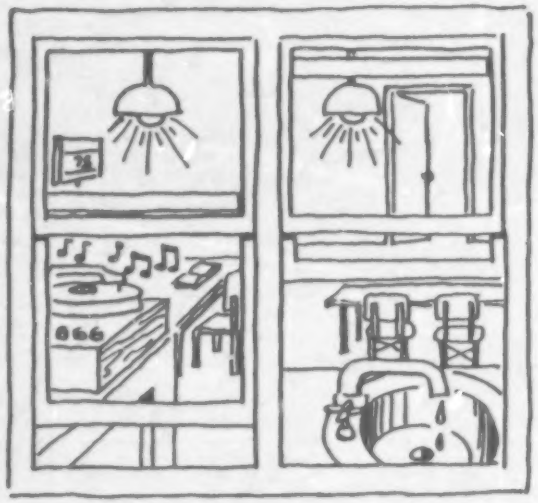
Mrs. Smith, the shopper, has several errands to accomplish in one afternoon. Tom and Suzie will be dismissed from school at 3:00 P.M. The weekly groceries need to be purchased. The dog is going to be left at the vet for a week. Suzie needs a pair of shoes. Tom has baseball practice at 3:45. Mrs. Smith needs to purchase a plunger at the local hardware store. She must also pick up some items from a friend's house for the church bazaar on Sunday. Suzie's friend, Sally will need a ride home from school.

Determine the best route for Mrs. Smith to take. Make a list arranging the steps in the order she will complete the shopping trip if she is energy efficient. After listing, trace and number the route on the map provided.



1.
2.
3.
4.
5.
6.
7.
8.

WHAT'S WRONG HERE?



PICTURE 1

PICTURE 2

PICTURE 3

Marketing Trip Evaluation

The major factors involved in energy consumption for marketing are the number of trips, distance to the market and mode of transportation. To obtain a better perspective of your family's marketing practices, take a survey of the trips your family members make to market in a week, recording the distance and mode of travel. Distances can be obtained from a city or county map, the car odometer, or by estimation (one city block is about one-eighth of a mile).

Date	Time	Destination	Mode of Travel	Distance

MARKETING TRIP EVALUATION

Have students use the information from completed data sheets to answer the following questions:

1. Using the completed data form, do you see possibilities for energy savings?

2. Are there trips by car of less than half a mile in distance?

3. Could several trips have been combined into one?

4. Could shopping be done on the way to or from work or school?

5. Could marketing have been done closer to home?

6. Would carpooling for shopping with neighbors be a possibility?

7. What recommendations would you make to your family for ways to conserve energy when marketing?

Suggestion: Survey the students at large to determine how they travel from home to school and back. Discuss findings and recommendations to class.

Leisure-Time Activities

1. Make a list of five leisure time activities you enjoy doing.

2. Rank in order each activity from the most important to the least important.

3. Next to each item, place a dollar sign ($) if the activity costs money each time it is performed.

4. For each item assign a mechanical energy point value. Give the activity a "3" if it requires a major amount of mechanical energy consumption, a "2" if a moderate amount of energy consumption and a "0" if it doesn't require any mechanical energy sources at all.

5. For each item, give 3 points for performing the activity a lot, 2 points if the activity is performed occasionally, and 1 point if performed seldom.

6. Total the points for each row. Which activities use the most energy?

7. Assume that a severe energy crisis now exists and that all people must conserve as much energy as possible. Cut back your leisure time activities at least 50%.

Class Discussion for Follow-Up:

Would you be willing to reduce by 50%? Why or why not?

How did you conserve energy? Which items did you reduce? Prioritize your list.

Does you priority ranking affect your decisions? If so, how?

Does the $ value have any effect on energy usage?

What types of activities can we do that are fun and do not require much use of additional energy sources?

E N E R G Y A U D I T

It is estimated that approximately 21 percent of the United States' total energy usage is consumed inside the home, almost all of which is used for heating and cooling. To see how your home and your energy-saving habits measure up, try this simple energy audit. The more "yes" lines you check, the closer you are to a home that is energy-efficient.

HEATING AND COOLING	YES	NO
1. Are heating supply and return registers clean and unobstructed by furniture or draperies?	___	___
2. Is the thermostat set no higher than 65-68 degrees during winter days?	___	___
3. Is the thermostat setting reduced to below 68 degrees when you're away during the winter?	___	___
4. In the winter, is the thermostat setting reduced to 60 degrees at night?	___	___
5. Are draperies closed at night to keep heat in?	___	___
6. Are draperies open to direct sun on winter days to help warm your home?	___	___
7. Is the air conditioner thermostat set no lower than 78 degrees?	___	___
8. Is the air conditioner thermostat set higher than 78 degrees or is it turned off when		

WATER HEATING AND WATER CONSERVATION	YES	NO
1. Is the water heater insulated?	___	___
2. Is the water heater set to deliver water no higher than 140 degrees F. at the sink?	___	___
3. Are leaky faucets promptly repaired?	___	___
4. Have water-saving devices been installed on showers?	___	___

THE KITCHEN

The Range

1. Is the lowest possible heat setting used?	___	___
2. Are pots and pans covered while food is cooking?	___	___
3. Are all burners not being used turned off?	___	___
4. Are several dishes or whole meals cooked in the oven at the same time?	___	___
5. Does the oven door have a window for viewing food while cooking?	___	___
6. Is the burner flame adjusted		

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you're away? ___ ___

9. Are furnace and air conditioner filters regularly cleaned? ___ ___

10. Are windows opened whenever possible, replacing the air conditioner? ___ ___

The dishwasher

1. Are full loads of dishes washed? ___ ___

2. Is the dishwasher's "energy-saver" option feature used? ___ ___

3. Is the low-energy, short wash cycle used whenever possible? ___ ___

The refrigerator

1. Is the refrigerator door opened and closed as quickly as possible? ___ ___

2. Is the manual defrost refrigerator regularly defrosted? ___ ___

3. Are condenser coils clean? ___ ___

4. Are refrigerator seals tight? ___ ___

5. Are foods cooled before placed in the refrigerator? ___ ___

to fit the size of the pan? ___ ___

7. Are flat-bottomed pans used? Are they sized to fit the burners? ___ ___

8. Is the gas range's flame clear blue? ___ ___

9. Is a microwave oven used whenever possible? ___ ___

THE LAUNDRY

The clothes dryer

1. Are only full loads dried? ___ ___

2. Is the lint filter cleaned after each use? ___ ___

3. Are clothes never overdried? ___ ___

4. Is the dryer vented to the outside? ___ ___

5. Is the dryer exhaust unobstructed? ___ ___

The clothes washer

1. Are clothes washed in the lowest water temperature that will do the job? ___ ___

2. Is the water level adjusted to the size of the load? ___ ___

3. Are clothes rinsed in cold water? ___ ___

Suggested Activities for "Energy Conservation Week"

1. Interview faculty concerning energy practices in the classroom.

2. Take an attitude survey or check sheet concerning energy awareness.

3. Write an article for the school newspaper about "Why Energy Conservation?" or "Better Living with Less Electricity."

4. Prepare bulletin or display case on Energy Conservation.

   Resource: Energy and the Family Loan Kit from GSU Consumer Services Department

5. Prepare energy conservation tips to be announced during morning announcement time.

6. Prepare an energy skit or teaching aid to be presented to primary classes. Resource: K-3 Experiences in Energy--Appendix A.

7. Invite Consumer Services Education Person from GSU to present a program for F.H.A., or P.T.A. on "Energy Management".

8. Field trip to the construction site of an N.E.W. house.

9. Make posters demonstrating Energy Facts and display them throughout school.

10. Plan Energy Conservation Party for F.H.A. and Home Economics Classes.

    Prepare food using the least amount of electricity or energy possible.

    Plan activities using no gas or electricity.

11. Give up one or two energy consuming appliances or activities for a week.

12. Make a draft dodger, lap robe, or warm sack as an F.H.A. money making project or home experience.

GLOSSARY

GLOSSARY

Active solar system - a space or hot water heating system that depends on energy-consuming equipment (pumps, blowers, electric controls, automatic tracking devices, etc,) to collect or to move the solar heat.

Air conditioning - the process of treating air to control its temperature, humidity, cleanliness, and distribution within a particular space.

Air conditioning filter - material usually made of fiberglass or foam rubber used to collect dust, dirt, grease and other particles and to prevent them from entering mechanical heating and cooling equipment.

Air Exchanges - uncontrolled movement of a volume of air in or out of a room or an entire building over a period of time. Air exchanges (AE) are sometimes expressed as whole-volume exchanges per hour or, alternatively, as cubic feet per minute (CFM). A standard, insulated new home is expected to have 1 AE/hour; a specially constructed, energy-efficient house may have only 1/2 AE/hour. Drafty, uninsulated houses typically have 2 - 4 AE/hour.

Air pollution - a level of concentration of foreign materials in the air that unfavorably affects the life and health of air breathing plants and animals (especially humankind) and/or affects property adversely.

Appliance - any device meant for a specific use, but especially those requiring commercial power input for operation. Common household appliances include refrigerators, stoves, toasters, dishwashers, mixers, irons, washers and dryers, television, and stereo sets.

Atomic energy - energy obtained from disturbances within the nucleus of the atom. The resulting disintegration of matter into energy may be spontaneous (as in natural radioactivity) or it may be induced artificially (as in nuclear fission for production of electricity and in uncontrolled fusion for the firepower of hydrogen bombs).

Attic ventilation - system used to remove heat and moisture from the attic. Example: wind turbines and eave vents without ventilation, heat build up may become excessive. At night, heat may continue to radiate into the rooms or space below. Ventilation is also required to remove damaging moisture from the attic.

Types include:

1. Wind turbines
2. Continuous ridge and soffit vents
3. Gables
4. Power vents

Barrel - a liquid volume equal to 42 gallons of 159 liters. One barrel of crude oil has about the same heat energy as 350 pounds of bituminous coal.

Blackout - a shutoff of all electrical power in a given area. It can be caused by storm damage, equipment failure, or overloaded circuits because of unusually heavy consumer use.

Brownout - the deliberate reduction of power to users of electric utilities whenever demand for power exceeds generating capacity. During a brownout, lights will dim and fans run more slowly. Some appliances stop running altogether.

B.T.U. (British Thermal Unit) - the amount of heat energy required to raise the temperature of one pound of water one degree Fahrenheit. One BTU is approximately equal to the amount of heat given off by a wooden match. A pound of coal contains approximately 13,000 BTU of chemical energy.

Calorie - the amount of heat required to raise the temperature of one ml of water one degree Celsius; a metric unit of heat energy.

Capacity - the maximum load for which a generator, transmission circuit, power plant, or system is designed.

Caulking - a soft, semi-solid material that can be squeezed into non-movable joints and cracks of a building, thereby reducing the flow of air in and out of the building.

Coal - solid fuel formed by the decomposition of plants buried deep under Earth's surface. A whole group of naturally occurring, carbon and hydrogen-rich rocks are called "coal". Various types are ranked by the percentage of carbon in dried samples or by the calorie value of moist ones. Age and depth of burial contributed to differential changes in the original plant debris. The concentration of carbon increased over time (hundreds of millions of years) as trapped moisture and gases eventually escaped and pressure forced changes in the organic remainder.

The chemical composition of coal varies widely. It is not homogeneous and regional differences, reflecting both variations in its history of formation and the kinds of plants involved, are common. However, gross distinctions can be made. From least to most carbon-rich, the coal group includes peat, lignite, sub-bituminous and bituminous coals, and anthracite.

Comfort zone - the ranges of indoor temperatures, humidity, and air movement under which most people enjoy a feeling of well-being.

Condensation - the change in state from a gas to a liquid, releasing energy.

Conduction - the flow of heat from a warm material to a cooler one in direct contact with it; the transmission of energy directly from molecule to molecule.

Conservation - making the best use of natural resources by reducing waste, improving efficiency, and slowing the rate of consumption.

Convection - transfer of heat energy by the movement of currents of a liquid or a gas.

Curtailment - cutting back the use of energy resources as opposed to conserving or wisely using resources.

Damper - a device used to vary or stop the volume of air passing through an air inlet, outlet, or duct, such as a fireplace.

Deciduous trees - trees which lose their leaves in the winter. They allow the sun in during the winter but keep the sun out during the summer.

Degree-day - the difference between 65° and the daily temperature. For example, if the low temperature for Friday was 12°F and the high for the day was 28°F, the number of degree-days for the day was

$$(65°F - \frac{28 + 12°F}{2}) = (65°F - 20°F) = 45$$

The greater the number of degree-days in a particular area, the higher the energy consumption for heating and cooling is likely to be.

Ductwork - if your home has central cooling and/or heating, it will have ductwork. Ductwork is the air delivery system to the rooms. It is most commonly found in the attic or in the furred down (low) areas of the ceiling.

E.E.R. (energy efficiency ratio) - rating used to help the consumer determine and compare the operating costs of heating and cooling equipment. E.E.R. indicates how completely an electrical appliance converts energy at the point of use. The rating is derived by comparing heating or cooling power (output) to energy consumed (input). The higher the rating, the more energy-efficient the equipment (Example E.E.R. of 9.0 would cost less to operate than E.E.R. of 6.5).

$$\frac{\text{BTU per hour (cooling capacity)}}{\text{watts (electrical consumption)}}$$

Efficiency - the ratio of useful work or energy output to total work or energy input. One hundred percent energy efficiency is impossible. There is always a cost or "handling charge" in any energy conversion. In addition, some forms of concentrated energy and some energy-consuming systems provide much more energy than is needed to do a particular task. For example, using a 350 horsepower car to transport one healthy person two miles to a swimming pool or gym for exercise is a highly inefficient use of both the driver and the car. A bicycle would be more efficient according to the standard pioneered by the American Physical Society: "thermodynamic efficiency is the ratio of the least available work that could perform the task to the available work actually consumed in doing the job with a given device or system."

Electric meter - device that measures electricity in kilowatt-hours and has either dials or numbers for recording the amount used.

Energy - the ability to produce motion against resistance (work); or, whatever heats, lights, moves, or changes matter.

Energy audit - the examination of a building's construction and materials, mechanical and electrical systems, energy usage patterns, in order to identify possibilities for energy conservation.

Evaporation - the change from liquid to gas which requires extraordinary absorption of heat by the material undergoing this phase change. Liquid water, for example, absorbs 540 extra calories per gram at 100°C as it vaporizes. This heat will be released again if the water vapor condenses.

Evergreen trees - trees that keep foliage all winter. Coniferous trees are evergreens which make especially good windbreaks.

Fiberglass - a material made of extremely fine filaments of glass which are used in masses as insulation.

Flourescent lamp - a lighting device in which light is produced by the passage of electricity through a metallic gas enclosed in a tube. Flourescent bulbs provide about four times as much illumination per watt as incandescent ones do; they give off about 75% less heat; they cost more initially but they last approximately seven times longer than incandescents; and they include types that can be used in existing incandescent fixtures.

Foot candles - the unit of direct illumination at a given location, equivalent to the energy of light received on a surface at a distance of one foot from a standard candle. It is equal to one lumen per square foot.

Forced air - a common type of heating system in which air heated in a furnace is then blower-driven or "forced" through ducts to all areas of the building. The primary fuel may be coal, fuel oil, natural gas, or wood, but electricity is also needed to power the blower and thermostat.

Fossil fuel - any naturally occurring underground fuel formed by decomposition and/or metamorphosis of the remains of ancient life forms. Coal, crude oil, and natural gas are fossil fuels.

Fuel - any substance used to provide heat energy.

Gasket - rubber, plastic, or metal band used around the door frames of appliances and cars to form a tight seal, reducing energy losses by infiltration.

Geothermal energy - heat trapped in the interior of the Earth is called geothermal energy. Boreholes into the crust show an average temperature increase of 1°C for every 30 meters depth, or about 100°F per mile. Geothermal heat is believed to come from the decay of radioactive materials deep in the Earth as well as some from friction of rock movements, tidal forces, and perhaps other sources. This heat keeps great quantities of buried rock molten and hot. Some of this energy escapes at the surface as hot water. Geothermal energy is available in four forms; dry steam, wet steam, hot rocks, and geopressured hot water.

Greenhouse effect - the warming effect of carbon dioxide and water in the atmosphere acting as a "lid" to slow the escape of heat from the Earth's surface. Molecules of water and carbon dioxide absorb and reradiate back to Earth much of the heat radiated from it.

Heat gain - the amount of heat provided to an enclosed space from all sources, including people, lights, appliances, sunshine, and furnace; a figure used to estimate the size and performance of heating and air conditioning system.

Heat loss - a decrease in the amount of heat contained within an enclosed space, resulting from heat flow through walls, windows, roof, and other building components.

Heat pump - a device that transfers heat from a cooler region to a warmer one (or vice versa) by the expenditure of mechanical or electrical energy. The heat pump operates by alternately evaporating and condensing a refrigerant, or heat transferring fluid, in a closed cycle. It differs from a typical refrigeration unit in that the heat pump can reverse its cycle to provide heat instead of removing it. Heat pumps are both heaters and air-conditioners and, compared to electric resistance elements often used in all-electric homes, they are more efficient.

Hydroelectric plant - an electric power plant in which the turbine-generators are driven by falling water.

Incandescent light - a common lighting device containing a solid filament that glows when electric current is passed through it. The filament's resistance to the current makes it glow with heat. The output of an ordinary incandescent bulb is about 95% heat.

Infiltration - the natural process by which air leaks into or out of a building, especially through cracks around doors, windows, vents, electrical outlets, and any other small openings or breaks in the exterior surface. Wind, significant temperature differences between the interior and exterior, lack of caulking and weatherstripping, numerous windows and vents, and inadequate insulation all contribute to high rates of infiltration.

Insulation - material used in home construction to retard (slow down) the heat loss from a home in the winter and heat gain in summer. Some commonly used materials are fiberglass, cellulose, mineral or rock wool, and styrofoam.

Intermediate peak period - 10 a.m. to 2 p.m. and 6 p.m. to 10 p.m. in GSU service area. A period of moderate use of electricity.

KWH - (kilowatt-hour) - the amount of energy equal to 1000 watts of electricity used for one hour. (Example: Ten 100-watt light bulbs burning for one hour.)

Life cycle cost - the total cost of an article over its entire useful life, including operating, maintenance, and financing expenses in addition to the purchase price.

Megawatt - a unit of power equal to 1,000 kilowatts or 1,000,000 watts. It is usually used to describe the capacity of power plants.

Natural gas - mixture of gaseous hydrocarbons occurring naturally in certain rocks. There are several kinds of gas trapped in porous rocks underground. One of these "natural gases" is methane, used as a commercial fuel. Petroleum deposits always include some methane, but natural gas deposits are not always accompanied by petroleum. Natural gas is commonly sold to individuals in hundreds of cubic feet (Ccf), the unit appearing on household utility bills. One Ccf of commercial methane has about 25,000 Calories, the equivalent of 8 pounds of coal of 0.7 gallons of crude oil.

Natural gas meter - device that has dials like the electric meter, but measures gas consumption in hundreds of cubic feet.

Non-renewable resources - energy resources that are not being replaced during human history. Examples are coal, oil, natural gas, and uranium.

Nuclear power plant - a generating station that converts nuclear energy into some form of useful power, such as mechanical or electrical power. In a nuclear power plant, heat produced by a reactor is generally used to make steam to drive a turbine that, in turn, drives an electric generator.

Nuclear reaction - a change in an atomic nucleus due to fission, fusion, neutron capture, or radioactive decay, as distinguished from a chemical reaction which is limited to changes in electron structure surrounding the nucleus.

Off-peak period - when demand for electricity is the least. 10 p.m. to 10 a.m. on weekdays and all weekend in GSU service area. (On weekends, industries do not need as much electricity and businesses are closed.)

Overhang - a solid horizontal projection on the exterior of a building placed (ideally) so that it shades southern windows in summer only. An overhang may be fixed or movable, part of the original construction or a retrofit. Several designs are possible. An upward-tilted overhang can also serve as a reflector in winter.

Passive solar system - Building design, materials, and equipment that together deliver 50 times more heat to the interior of a building than does the non-renewable supplementary energy it uses. Passive systems rely on natural energy flows, collection, and storage with a minimum of mechanical aids and a minimal use of fossil fuels.

Payback period - the amount of time it takes for an energy-saving improvement to pay for itself through savings on the utility bill. If adding R-30 insulation to a home with R-0 insulation costs $500 and you save $250 a year on your utility bill, it would pay for itself in 2 years.

$$\frac{\$500 \text{ (cost for insulation)}}{\$250 \text{ (yearly savings)}}$$

Peak period - Time of day when the greatest demand for electricity occurs (2 - 5 p.m., Monday through Friday).

Petroleum - a naturally occurring, oily, dark-colored liquid mixture of hydrocarbons. Refineries distill this raw material into gasoline, kerosene, diesel fuel, lubricating oil, waxes, and other products.

R-Value - the resistance to heat flow. The higher the R-value, the greater the insulating efficiency of the material. Thickness is a factor also, so R-values are commonly stated per inch of building material. R-values are additive--thicker material or a combination of materials means increased resistance to heat flow. Some typical R-values per inch of material are 6.25 for polyurethane foam; 3.17 for fiberglass batts; 1.25 for fir and pine wood; 0.18 for plaster; and 0.08 for concrete.

Radiation - emission and propagation of energy through space; pure energy that travels rapidly until striking materials that can absorb it. Then absorbed radiation will either induce a chemical change (as in photosynthesis, sun tanning, photography, photovoltaic cells) or increase the random motion of the molecules of the material contributing to its temperature. Examples of bodies emitting radiation are the sun, electric lights, human beings, waters and cements that are warmer than their surroundings, Franklin stoves, and radioactive materials.

Reclamation - Process of replacing the soil, clay, and rocks removed earlier to expose coal or oil shale for strip mining; compacting and leveling the site; and replanting it to restore its appearance and reduce erosion and drainage of waste materials.

Renewable resources - materials that are recycled by natural proccesses within a relatively brief span of time (a human lifetime). Fresh water, wind, sunshine, and trees are some examples of resources that seem to renew themselves within human time frames.

Retrofit - add energy-saving features to an existing home.

Site orientation - the relationship of a home's or building's position to prevailing winds, sun, vegetation, and other buildings, which can affect the heat loss or heat gain performance of the home or building. Example: locating a home so that most of the windows are facing north and south in order to minimize heat gain in the summer.

Solar cell - a thin sheet of semi-metallic material (usually silicon) which can convert energy from the Sun directly into electricity. An individual cell on the retail market in 1980 typically produces a small potential difference of about 0.5 volts and about 0.6 watts of power. An array of solar cells can provide a useful electrical capacity.

Solar collector - a device which collects the Sun's energy as heat. They are made in many shapes and styles: flat-plate, tubular, and concentrating. Air or liquids are the fluid media usually used for heat transfer.

Solar energy - electromagnetic radiation emitted by the nearest star, the Sun. Earth receives about 4.2 quadrillion kilowatt-hours of energy per day from the Sun.

Storm window - a glass or plastic covering for a conventional window, used to provide additional protection from cold and wind. A well-sealed storm window traps an insulating layer of air between itself and the other window, decreasig heat loss due to conduction through the glass and keeping the inside pane warmer.

Strip-mining - a method of mining coal that lies less than 110 feet below the surface. Overburden (soil, clay, and rock, above the fuel) is scraped away by huge mechanical shovels and stored, layer by layer, in separate piles. The coal is removed and then (ideally) layers of overburden are replaced in their former relative positions, topsoil uppermost.

Thermostat - a temperature-sensitive device which turns heating and cooling equipment on and off at set temperatures.

Ton of air conditioning - the thermal refrigeration energy required to melt one ton of ice (2,000 pounds). As a means of expressing cooling capacity, 1 ton = 12,000 BTU/hour cooling.

Vapor barrier - a material used to prevent moisture from passing through warm interior walls of a building and condensing on the cold exterior walls, thus soaking insulation and causing other problems. Plastic sheeting is often sealed against wall studs as a vapor barrier; special backing on batt and blanket insulation, foil or plastic wall coverings and special interior paints are other vapor barriers used to keep humidity inside a building.

Watt - a measure of electrical power. Wattage is a product of the voltage (measure of the "pressure" in an electrical circuit) and the amperes (current or flow of electricity). One volt and one amp applied to a circuit for one hour would use one watt-hour of electricity.

Weather stripping - foam, metal, felt, or rubber strips used to form a seal around windows, doors, vents, and other movable openings where infiltration can occur.

Wind break - a dense row of trees, or a fence or other barrier that interrupts and changes the local path of the wind.